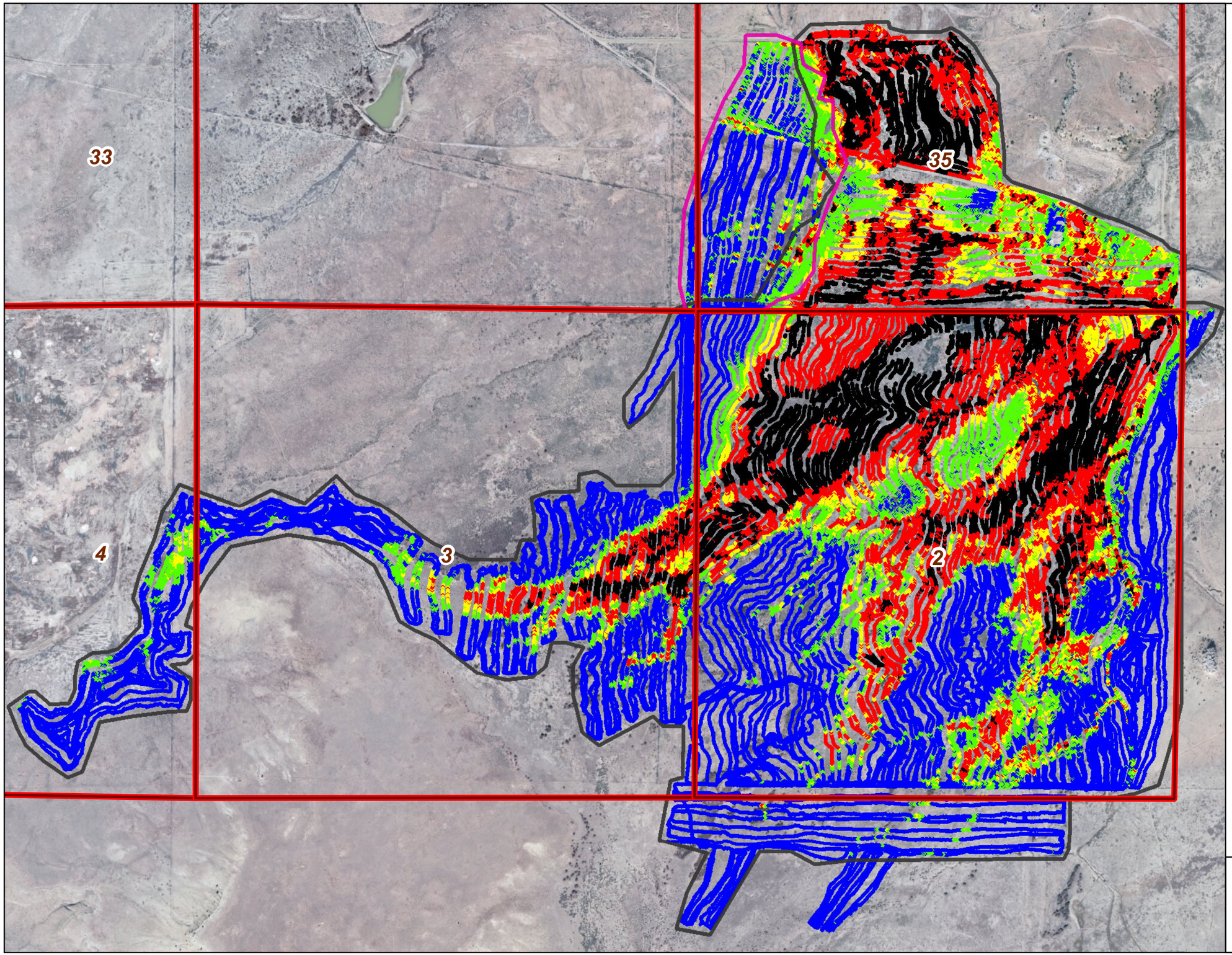


INTERA

N

1,000 500 0 1,000
Feet

Legend

2007 Survey Boundary

2005 Survey Boundary

Gamma Count Rate (cpm)

- <= 29,000
- 29,001 - 40,000
- 40,001 - 50,000
- 50,001 - 100,000
- >100,000

Appendix A Figure
Soil Survey (ERG Gamma Count)
Rio Algom

FILE: S:\Projects\RIO\Graphics\GIS\MapDocs\Gamma2005-2007.mxd 1/29/2015

Phase 2 Characterization Report for the Section 35 and 36 Mine Drainage

October 2007

Rio Algom Mining, LLC
P. O. Box 218
Grants, New Mexico 87020

Prepared by:

Environmental Restoration Group, Inc.
8809 Washington Ave. NE, Suite 150
Albuquerque, NM 87113

Table of Contents

Section **Page**

Figures

Tables

Attachments

1.0 Introduction

Environmental Restoration Group, Inc (ERG) was retained by Rio Algom Mining, LLC (RAML) to conduct a second phase of characterization (Phase 2) with respect to land areas affected by the Section 35 and 36 mine drainages. This work was conducted between May and June 2007. ERG conducted the first phase (Phase 1) from May through July 2005 and reported its findings to the New Mexico Environment Department (NMED) in *Characterization Report for the Section 35 and 36 Mine Drainage*, dated October, 2005.

NMED has advised RAML to comply with New Mexico Administrative Code (NMAC) § 20.6.2.1203 and regards soil contamination, in whole or in part, as within its authority relating to un-permitted discharges from underground mine dewatering activities at the Section 35 and 36 mines. Pursuant to Section 1203, NMED directed RAML to report what is known about the affected soils and, using NMAC §20.6.2.3103, assess corrective action appropriate to the discharges, including the existence of potential or problematic alluvial water and/or water contaminants in the soils that may migrate and adversely impact groundwater. RAML is adhering to NMED Soil Screening Levels (SSLs) for heavy metals and Uranium Mill Tailings Radiation Control Act (UMTRCA) cleanup limits for radium-226 as relevant guideline limits for constituents in soil.

The soil cleanup limits for radium-226 and radium-228 resulting from conventional milling, ion exchange (IX) or in situ recovery operations, are 5 picocuries per gram (pCi/g) in the first 15-centimeter (cm) layer of soil averaged over a 100 square meter (m^2) area and 15 pCi/g above background averaged over a 100 m^2 area in any 15-cm layer thereafter. Where other radionuclides besides radium, such as natural uranium and thorium, are present, radium limits are required to be reduced by calculation, to account for risks posed by the additional radionuclides.
RAML is

The Phase 2 investigation was conducted in accordance with a work plan RAML submitted to NMED on 8 November, 2005 **or** 29 September, 2006. RAML conducted each of the tasks outlined in the work plan, and added a Global Positioning System (GPS)-based gamma radiation survey in a small area off the northwest edge of the survey conducted in Phase 1.

The Phase 2 characterization covers affected land area lies south and southwest of the Section 35 and 36 Mines. Discharges to these lands occurred between 1957 and 1990, via natural run off or drainage flow from the mines onto adjacent lands and flood irrigation practices. The discharged water was untreated between 1957 and 1976 and treated for removal of radiological constituents, between 1977 and 1990. Vegetation colonized irrigated areas and now covers portions of the impacted area. In general, residual constituents from the discharge water are expected to co-occur with the vegetation. Vegetation may no longer be present where water is no longer available.

A background study was not conducted as part of either the Phase 1 or Phase 2 investigations. Based on the observed gamma ray levels, RAML assumes that typical background areas occur within and along the edges of the Phase 1 and 2 survey areas. Additionally, all soil samples were collected with a Geoprobe, there were no trenches used for sampling as discussed in the Rio Algom work plan.

2.0 Summary of Soil Characterization

The following tasks were performed during the characterization:

- Soil samples were collected up to 12 ft bgs, using a Geoprobe®.
- A GPS-based gamma survey was conducted in a previously uncharacterized area.

2.1 Soil Sampling

The work plan stated that the following samples would be collected: two from the primary drainage channels, 12 from areas surrounding the main drainage, and at least two from areas adjacent to the study area to represent conditions that are not influenced by mine discharge water. The work plan also stated that a backhoe would be used to collect the samples. RAML chose instead to collect the samples using a Geoprobe® equipped with a Macrocore® sampler, to minimize safety issues associated with trenching and better collect discrete samples. In addition, field personnel installed 28 borings, as opposed to the 16 trenches proposed in the work plan. Furthermore, a 1-minute integrated gamma radiation count was taken at each location, immediately prior to drilling, using a Ludlum Model 2221 coupled to a Ludlum 44-10 sodium iodide detector. The detector was held at 18 in. above ground surface. This measurement was taken to record representative gamma radiation levels in the vicinity of the boring. Finally, field personnel screened soil samples in the RAML office, to assist the decision regarding which samples would be sent to the offsite vendor laboratory for analysis.

Figure 2.1-1 presents the 28 actual sampling locations. Borings SB-21, SB-22, and SB-25 were installed in drainages. Boring SB-26 was installed west of the impacted areas, presumed to be background based on gamma readings (1-minute count rate was 11,786 counts per minute [cpm]). The gamma reading at Location SB-16 is similar, at 11,668 cpm. The remaining locations were installed in the areas outside of drainage channels but presumably subject to flooding by way of the outfalls and/or impacts via wind deposition.

Figure 2.1-1 also presents the 2005 and 2007 gamma survey boundaries and the locations of seven monitoring wells installed to accompany the Phase 2 subsurface soils investigation.

Soil sampling occurred as follows. As the Geoprobe® advanced, 4-ft discrete soil samples were collected within a plastic sleeve installed in the Macrocore® sampler. If a particular boring was planned at 12 ft bgs, the Macrocore® was advanced and processed three times. Field personnel portioned each of the samples into the following depth intervals (all in ft bgs): 0-1 ft, 1-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 8-10 ft, and 10-12 ft. The samples were transferred into pre-labeled 1-gallon Ziploc bags. The samples were screened for gamma-emitting radionuclides at the RAML office using the apparatus shown in Figure 2.1-2. The apparatus was a square formed of lead bricks that housed the samples, which was covered by a circular lead shield with a smaller circular opening for the detector. The detector, a Ludlum Model 44-10 coupled to a Ludlum 2221 ratemeter/scaler, itself was shielded with a Ludlum collimator designed for the detector. Each sample was counted for one minute (integrated).

RAML used guidance in the work plan, professional judgment, and field screening results to select a portion of the samples for laboratory analysis. RAML sent the following samples to ACZ Laboratories, Inc. in Steamboat Springs, Colorado for analysis: 0 to 1 ft (12 samples); 1-2 ft (27 samples); 2-4 ft (16 samples); 4-6 ft (8 samples); 10-12 ft (15 samples). ACZ analyzed the samples for total and dissolved concentrations of radionuclides, heavy metals, and major ions in the soil. Dissolved concentrations were determined using leachate tests. Comparing the total

and dissolved constituents indicates the potentially mobile fraction of total concentrations that would be attributable to the mine discharge water.

The methods and analytes were:

- U.S. Environmental Protection Agency (EPA) Method 1312 to extract arsenic, barium, molybdenum, selenium, silver, uranium, vanadium, radium, chloride, nitrate/nitrite, total dissolved solids (TDS), and sulfate.
- EPA Method 6020 for total concentrations and on the extracted (dissolved) arsenic, selenium, and uranium; and the extracted silver.
- EPA Method 6010B for total and dissolved concentrations of barium, molybdenum, and vanadium
- EPA Method 6010B for total silver
- EPA Method 903.1 for total radium-226
- EPA Method 904.0 for total radium-228
- EPA Method 9315 for dissolved radium-226
- EPA Method 9320 for dissolved radium-228
- EPA Method 325.2 for dissolved chloride
- EPA Method 353.2 for dissolved nitrate/nitrite
- EPA Method 160.1/SM 2540C for TDS
- EPA Method SM 4500 SO4-D for sulfate

Total results are reported in milligrams per kilogram (mg/kg, for metals and uranium) or picocuries per gram (pCi/g, radium only). Dissolved constituents from leachate tests are reported in milligrams per liter (mg/L) or pCi/L.

The following samples were submitted for offsite laboratory analysis:

- 12 samples from 0-1 ft
- 27 samples from 1-2 ft
- 16 samples from 2-4 ft
- 8 samples from 4-6 ft
- 15 samples from 10-12 ft

2.2 GPS-Based Gamma Survey

In addition to the above, ERG conducted a gamma survey of a land area associated with the Section 35 and 36 Mine drainage on 14 June, 2007. RAML presumed the area was impacted by flooding and added the task to characterize gamma emissions in the area. The gamma survey was a supplement to the survey conducted in May and June, 2005, previously reported to NMED in *Characterization Report for the Section 35 and 36 Mine Drainage,* dated October 2005. The survey covered an approximate 72 acre area in and around the location of the Section 35 mineshaft, Township 14 North, Range 9 West, Section 35. The eastern edge of the land area is contiguous with a portion of the northwest corner of the Phase 1 survey.

The radiological data-mapping system consisted of two Trimble ProXRS global positioning systems (GPS), each paired with a digital ratemeter/scaler (Ludlum Model 2221) and 2-inch by 2-inch sodium iodide (NaI) detector (Ludlum Model 44-10). The Ludlum Model 2221s were operated in ratemeter mode, in which counts are automatically displayed at one-second intervals. The radiological count-rate data were automatically paired with differentially-corrected location coordinates at the time the count rate is recorded using GPS units. The survey was conducted on foot by two technicians, with a detector separation of approximately 50 to 100 ft, and detector held at 18 in. above the ground surface.

Instrumentation calibration and function check data for the instruments used in the GPS-gamma surveys are presented in Attachment A.

3.0 Results of Soil Characterization

Results are presented and described as changes observed in the extent of radionuclide constituents with the inclusion of Phase 2 data, and the extents of total and leachable radionuclide, heavy metals and major ion concentrations in surface and subsurface soils.

The results of the Phase 2 GPS-based gamma survey are also presented in this section.

The ACZ laboratory results are presented in Attachment B.

3.1 Assumed Background Concentrations

Based on the observed gamma ray levels, RAML assumes that background areas, i.e. those areas subject to the Phase 1 and 2 investigations not subject to discharges from the IX Outfall, occur within and along the edges of the Phase 1 and 2 survey areas. The lowest observed 1-minute integrated count rates measured at the Phase 2 boring locations were 11,668 (Boring SB-16) and 11,786 cpm (Boring SB-26). It is assumed that count rates similar to those observed at Borings SB-16 and -26 represent count rates exhibited by local background surface soils. It is recognized that lower or higher counts exhibited by surface soils could also represent background surface soils, however, the choice of the lowest observed static count rates appears to be the most reasonable. It is also recognized that soil concentrations in the two borings may not represent background.

Where analyzed, radium-226 concentrations (in pCi/g) in the two assumed background borings are:

- 0.57 at 0-1 ft (Boring SB-16)
- 0.96 at 1-2 ft (Boring SB-26)
- 0.36 at 2-4 ft (Boring SB-26)
- 0.51 at 4-6 ft (Boring SB-16)
- An average of 0.11 at 10-12 ft from both borings

Natural uranium concentrations (in mg/kg) in the two assumed background borings are:

- 0.94 at 0-1 ft (Boring SB-16)
- 0.52 at 1-2 ft (Boring SB-26
- 0.74 at 2-4 ft (Boring SB-26)
- 0.86 at 4-6 ft (Boring SB-16)
- An average of 0.58 at 10-12 ft from both borings

Arsenic concentrations (in mg/kg) in the two assumed background borings are:

- 5.9 at 0-1 ft (Boring SB-16)
- 4.3 at 1-2 ft (Boring SB-26)
- 5.6 at 2-4 ft (Boring SB-26)
- 6.0 at 4-6 ft (Boring SB-16)
- An average of 3.1 at 10-12 ft in both borings

Selenium concentrations (in mg/kg) in the two assumed background borings are:

- 0.72 at 0-1 ft (Boring SB-16)
- 0.05 at 1-2 ft (Boring SB-26, qualified as detected in blank)
- 0.05 at 2-4 ft (Boring SB-26, qualified as not detected at 0.05 mg/kg)
- 0.31 at 4-6 ft (Boring SB-16)
- 0.12 and 0.16 at 10-12 ft in Borings SB-16 and -26, respectively, both qualified as detected in blank.

3.1 Radionuclide Concentrations in Soil Samples

The radionuclide results are presented in Table 3.1-1. Total and dissolved radionuclide concentrations are listed in Tables 3.1-2 (radium) and 3.1-3 (uranium).

3.1.1 Changes in Extent of Radionuclide Constituents

Considering that the Phase 1 and Phase 2 samples were collected in 6 and 12 in. intervals, respectively, the surface samples in the two data sets can be compared indirectly if one assumes the majority of the observed concentration in each Phase 2 sample occurs in the upper 6 in. In this case, radium-226 concentrations exceed UMTRCA standards in six of the 12 Phase 2 samples collected from 0-1 ft: SB-11 (14 pCi/g), SB-12 (11 pCi/g), SB-13 (8.7 pCi/g), SB-15 (7.1 pCi/g), SB-17 (6.2 pCi/g), and SB-21 (8.5 pCi/g); and one of the 27 from 1-2 ft (SB-05: 18 pCi/g). These exceedances occur in areas previously identified as being impacted to at least 6 in. Radium concentrations in the six remaining 0-1 ft samples are located in areas identified in Phase 1 as not exceeding UMTRCA standards. Thus, the concentrations of radionuclides are consistent with those observed in Phase 1.

The range of concentrations in all samples is 0.2 to 18 pCi/g. Average radium-226 concentrations decrease with increasing depth in the soil: 5.4 (0-1 ft), 2.2 (1-2 ft), 0.9 (2-4 ft), 2.9 (4-6 ft), and 0.3 pCi/g (10-12 ft).

Radium-226 concentrations exceed assumed background concentrations at their respective depths in 69 of the 78 samples.

Average uranium concentrations also decrease with depth in the soil layers: 11.59 (0-1 ft), 16.10 (1-2 ft), 11.79 (2-4 ft), 8.99 (4-6 ft), and 2.50 mg/kg (10-12 ft).

Uranium concentrations exceed assumed background concentrations at their respective depths in 77 of the 78 samples.

3.1.2 Comparison of Total and Dissolved Radionuclide Concentrations

With one exception, the dissolved leachate concentrations of the sum of the two radiums (radium-226 and radium-228) from the soil samples are below the NMAC WQCC standard of 30 pCi/L. The exception is observed in the 0 to 1 ft sample collected from Boring SB-28. The result (276.5 pCi/L) appears to be a laboratory artifact, considering that the larger fraction is contributed by radium-226 (270 pCi/L) but unsupported by a relatively low total radium-226 result (4.2 pCi/g).

For the sum of two radiums (radium-226 and radium-228), the average ratio of leachable to total concentrations is one order of magnitude higher in the 0 to 1 ft soil samples, at 0.005, than the lower intervals. There are no apparent differences in the ratios at the lower depths: 0.0007 at 1 to 2 ft, 0.0008 at 2 to 4 ft, 0.0005 at 4 to 6 ft, and 0.0007 at 10 to 12 ft. These results indicate that at least some of the total radium in the surface soil remains leachable, implying there has not been a sufficient driver, i.e., recharge from rainfall and an end to the flooding irrigation, to mobilize the radium. Alternatively, the store of leachable radium has leached but has not been completely depleted. The store has not accumulated in the depth intervals sampled as part of the Phase 2 investigation.

The average ratio of leachable to total uranium concentrations is the same order of magnitude in each of the depth intervals: 0.002 at 0 to 1 ft, 0.003 at 1 to 2 and 2 to 4 ft, 0.007 at 4 to 6 ft, and 0.001 at 10 to 12 ft.

3.2 Metals Concentrations in Soil Samples

The metals results are presented in Tables 3.2-1 (totals) and 3.2-2 (leachable).

3.2.1 Total Concentrations

With the exception of arsenic, total metals concentrations are below the NMED SSLs in all Phase 2 soil samples. The data presented in Table 3.2-1 include laboratory qualifiers, the definitions of which are listed below the table and in the analytical data packages in Attachment 1. In all cases, the detection limits are below respective NMED SSLs.

The NMED SSL for arsenic in surface soil (0 to 6 inches) is 3.9 mg/kg. Three ranges that overlap one another and include the NMED SSL are as follows:

- 2.7 to 6.0 mg/kg in the samples collected from background Borings SB-16 and SB-26.
- 3.3 to 10.8 mg/kg in the entire data set of samples.
- 3.3 to 7.2 mg/kg in samples where radium concentrations exceed the UMTRCA standards.

The first and second observations indicate that although the observed arsenic concentrations exceed the SSL, they are similar to background.

3.2.2 Dissolved Concentrations

With the exception of selenium, metals concentrations are below respective NMAC WQCC standards in all Phase 2 leachate collected from soil samples. Selenium levels are greater than 0.05 mg/L as follows:

- None of the 11 samples collected at 0-1 ft.
- 4 of 28 samples at 1-2 ft.
- 4 of 16 samples at 2-4 ft.
- 2 of 8 samples at 4-6 ft.
- None of the 15 samples collected at 10-12 ft.

With the exception of the 2 to 4 ft interval, the average ratio of leachable to total selenium concentrations increases with increasing depth: 0.005 at 0-1 ft, 0.01 at 1-2, 0.003 at 2-4 ft, 0.018 at 4-6 ft, and 0.02 at 10-12 ft.

The data are presented in Table 3.2-2.

3.3 Major Ions Concentrations in Soil Samples

The concentrations of leachable major ions (nitrate/nitrite, chloride, and sulfate) and total dissolved solids are below their respective New Mexico Administration Code (NMAC) Water Quality Control Commission (WQCC) standards in all soil samples.

The data are presented in Table 3.3-1.

3.4 Gamma Survey

Figure 3.3.-1 depicts the gamma radiation readings observed during the 2005 and 2007 surveys. Gross gamma readings are presented in counts per minute (cpm) in the following ranges: less than 29,000 cpm, 29,001 to 40,000 cpm, 40,001 to 50,000 cpm, 50,001 to 100,000 cpm, and greater than 100,000 cpm. The areas of the 2005 and 2007 surveys are approximately 1,080 and 72 acres, respectively. No data were collected in the white areas shown on Figure 3.3-1. Obstructions such as trees and/or existing excavations precluded surveying these areas.
The 2005 and 2007 gamma survey statistics, combined, are:

- No. of counts: 347,618
- Range: 6,805 to 999,960 cpm
- Mean: 69,374
- Standard Deviation: 107,640

3.5 Updated Volume Estimates

Adopting the same assumptions used to obtain the volume estimates presented in the 2005 Characterization Report, gamma counts exceeding 21,402 cpm occur in approximately 19 of the 72 acres surveyed in 2007. Assuming a 6-in. cut of 19 acres and 20 percent positive uncertainty, 15,327 (best estimate) to a contingency of 18,400 cubic yards (yd^3) can be added to the 2005 volume estimate. This is a 2.1 to 2.6 percent increase to the 2005 best estimate.

4.0 Conclusions

The findings of the Phase 2 investigation can be summarized as follows:

- Radium-226 levels in the soil samples indicate no significant changes in the volume estimates presented in the 2005 Characterization Report.

- The Phase 2 gamma survey revealed new areas where the radium-226 concentrations are likely to exceed UMTRCA standards, adding an estimated 2.1 percent to the best volume estimate.

- Arsenic concentrations in the majority of soil samples collected from assumed background and impacted areas exceed the NMED SSL. However, the arsenic levels are similar to those observed in background soils.

- Trends in the average ratios of leachable to total concentrations indicate that the leachable fractions of radium and uranium in the soils are essentially constant with depth. The leachable fraction of selenium increases with depth, but the dissolved leachable concentrations are below the NMAC WQCC standard at 10-12 ft and total concentrations are below the NMED SSL in all soil samples.

- The leachable fraction of uranium exceeds the NMAC WQCC standard in several samples, predominantly at 1-6 ft but not at 10-12 feet.

- The leachable fractions of other heavy metals, major ions, and TSS are below NMAC WQCC standards.

Figure 2.1-1. Phase 2 Soil Boring and Monitoring Well Locations

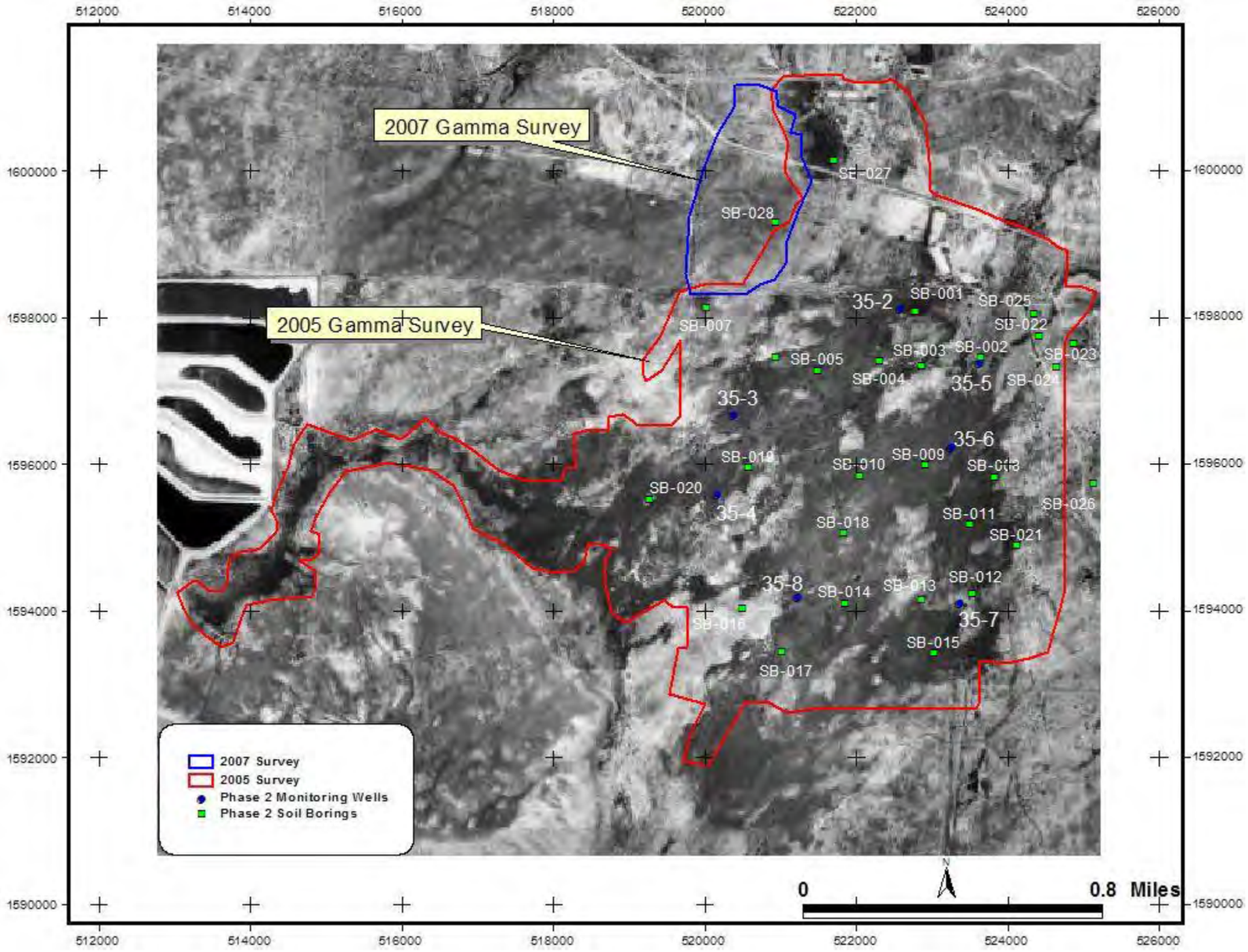


Figure 3.3-1. 2005 and 2007 Gamma Survey Data

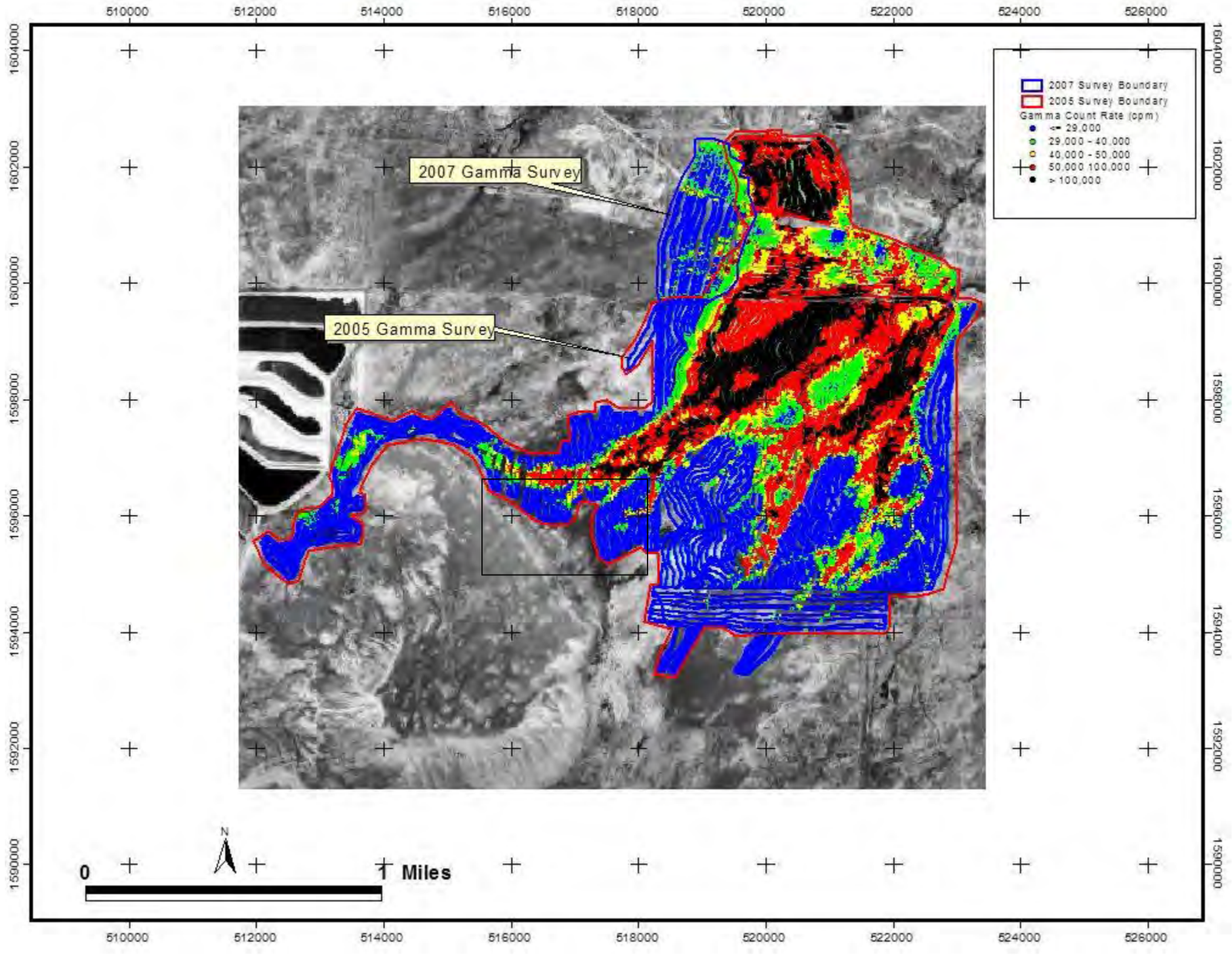


Table 3.1-1. Total Radionuclide Concentrations in Soil Samples

	Depth Interval (ft)	0-1					1-2					2-4					4-6					10-12				
	Radionuclide	Uranium	Radium-226		Radium-228		Uranium	Radium-226		Radium-228		Uranium	Radium-226		Radium-228		Uranium	Radium-226		Radium-228		Uranium	Radium-226		Radium-228	
	UMTRCA Standard (pCi/g)	-	5 or 15 + bkg					5 or 15 + bkg					5 or 15 + bkg					5 or 15 + bkg					5 or 15 + bkg			
Boring ID	Field 1-min NaI Reading (cpm)	mg/kg	pCi/g	Error	pCi/g	Error	mg/kg	pCi/g	Error	pCi/g	Error	mg/kg	pCi/g	Error	pCi/g	Error	mg/kg	pCi/g	Error	pCi/g	Error	mg/kg	pCi/g	Error	pCi/g	Error
1	177782	-	-	-	-	-	34.90	5.3	0.50	1.9	1.3	35.10	0.25	0.2	1.3	1.2	10.90	0.29	0.18	2.2	1.2	3.25	0.23	0.2	1.6	1.1
2	77991	-	-	-	-	-	14.90	1.3	0.3	1.7	1.3	5.04	0.92	0.22	2.1	1.2	7.78	1.3	0.26	2.7	1.2	0.89	0.4	0.19	0.69	1.2
3	37506	-	-	-	-	-	5.09	1.1	0.3	1.5	1.2	3.48	0.32	0.21	1.8	1.3	-	-	-	-	-	-	-	-	-	-
4	78532	-	-	-	-	-	3.73	1.5	0.24	1.9	1.3	2.12	0.65	0.25	0.92	1.1	4.31	1.7	0.33	2.3	1.1	-	-	-	-	-
5	238857	-	-	-	-	-	41.30	**18**	0.84	1.4	1.3	24.70	1.8	0.25	1.3	1	-	-	-	-	-	-				
6	814825	-	-	-	-	-	5.28	2.2	0.44	2.4	1.1	1.29	0.36	0.24	1.2	1.1	19.10	6.3	0.46	1.2	1.2	0.86	0.35	0.19	1.1	1.2
7	17592	1.29	0.57	0.14	1.8	1.1	0.57	0.47	0.17	1.9	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	84771	-	-	-	-	-	9.48	0.62	0.16	2.6	1.2	5.91	0.2	0.19	3.5	1.1	-	-	-	-	-	2.18	0.7	0.25	0.99	1.2
9	77036	-	-	-	-	-	30.10	4	0.38	2.9	1.2	5.78	0.49	0.24	3.9	1.5	-	-	-	-	-	-	-	-	-	-
10	51614	-	-	-	-	-	9.80	1.1	0.22	2.8	1.2	10.60	0.85	0.2	1.9	1.1	-	-	-	-	-	1.45	0.27	0.18	0.47	1
11	163367	7.75	**14**	0.8	1.4	1.1	6.61	0.72	0.21	2.3	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	30387	7.79	**11**	0.59	1.1	1	11.40	0.91	0.23	1.7	1.1	-	-	-	-	-	-	-	-	-	-	0.62	0.28	0.17	0.66	1.1
13	80025	19.50	**8.7**	0.56	2.5	1.2	12.00	2	0.27	1.6	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	15580	4.36	0.5	0.17	4.4	1.2	3.51	0.37	0.16	1	1.2	-	-	-	-	-	-	-	-	-	-	1.09	0.21	0.13	1.5	1.2
15	37507	12.80	**7.1**	0.56	2.5	1.2	6.75	0.95	0.22	1.9	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	11668	0.94	0.57	0.19	0.89	1	-	-	-	-	-	-	-	-	-	-	0.86	0.51	0.18	8.2	1.6	0.54	-0.05	0.11	1.8	1.2
17	25973	7.39	**6.2**	0.5	2.5	1.3	5.45	0.58	0.16	2.4	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	32642	14.80	2.1	0.29	1.4	1.2	9.24	3.4	0.33	0.69	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	30937	18.80	1.3	0.25	1.6	1.2	8.83	0.41	0.16	3.8	1.3	-	-	-	-	-	-	-	-	-	-	2.88	0.24	0.14	2.3	1.2
20	117639	-	-	-	-	-	30.00	1.8	0.28	1.7	1.1	10.70	3.2	0.38	3.2	1.2	9.50	4.6	0.41	2.8	1.3	2.43	0.31	0.16	1	1.3
21	34903	20.90	**8.5**	0.55	2.1	1.2	15.10	0.91	0.27	1.9	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	275096	-	-	-	-	-	67.50	3.6	0.43	2.4	1.2	27.40	1.2	0.26	2.1	1.2	17.80	1.7	0.31	0.23	1.1	12.00	0.57	0.16	1.3	1.3
23	18123	-	-	-	-	-	4.24	1.6	0.27	1.2	1.2	4.17	1.4	0.26	1.2	1.2	-	-	-	-	-	-	-	-	-	-
24	19566	-	-	-	-	-	1.00	0.4	0.24	1.4	1.2	0.58	0.29	0.16	0.76	1.1	-	-	-	-	-	0.58	0.23	0.16	2.9	1.3
25	445123	-	-	-	-	-	17.00	3.9	0.45	2.9	1.3	21.60	0.42	0.21	1.3	1.1	1.67	6.5	0.46	1	1.2	4.93	0.37	0.16	2.1	1.3
26	11786	-	-	-	-	-	0.52	0.96	0.22	2.6	1.3	0.74	0.36	0.18	0.95	1.2	-	-	-	-	-	0.61	0.26	0.17	1.8	1.2
27	69828	-	-	-	-	-	51.10	0.9	0.2	2.2	1.2	29.50	1.1	0.23	1.3	1.2	-	-	-	-	-	3.25	0.19	0.15	1.2	1.2
28	39896	22.70	4.2	0.38	0.8	1.1	29.40	1.6	0.28	2.2	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3.1-2. Total and Leachable Radium Concentrations in Soil Samples

Depth Interval (ft)		0-1						1-2						2-4					
Boring ID		Radium-226 (pCi/g)	Radium-226 (pCi/L)	Radium-228 (pCi/g)	Radium-228 (pCi/L)	Sum of Ra-226 & Ra-228 (pCi/L)	Leachable /Total Ra (kg/L)	Radium-226 (pCi/g)	Radium-226 (pCi/L)	Radium-228 (pCi/g)	Radium-228 (pCi/L)	Sum of Ra-226 & Ra-228 (pCi/L)	Leachable /Total Ra (kg/L)	Radium-226 (pCi/g)	Radium-226 (pCi/L)	Radium-228 (pCi/g)	Radium-228 (pCi/L)	Sum of Ra-226 & Ra-228 (pCi/L)	Leachable /Total Ra (kg/L)
UMTRCA Standard (pCi/g), WQCC (mg/L)	**Field 1-min NaI Reading (cpm)**	5 or 15 + bkg	-	-	-	30	-	5 or 15 + bkg	-	-	-	30	-	5 or 15 + bkg	-	-	-	30	-
1	177782	-	-	-	-	-	-	5.3	0.36	1.9	2.7	3.1	0.0004	0.25	0.05	1.3	1.1	1.2	0.0007
2	77991	-	-	-	-	-	-	1.3	0.3	1.7	2	2.3	0.0008	0.92	0.16	2.1	1.4	1.6	0.0005
3	37506	-	-	-	-	-	-	1.1	0.07	1.5	1.1	1.2	0.0005	0.32	0.16	1.8	1.2	1.4	0.0006
4	78532	-	-	-	-	-	-	1.5	0.2	1.9	3.9	4.1	0.0012	0.65	0.2	0.92	1.5	1.7	0.0011
5	238857	-	-	-	-	-	-	**18**	0.76	1.4	2.2	3.0	0.0002	1.8	0.13	1.3	0.19	0.3	0.0001
6	814825	-	-	-	-	-	-	2.2	0.63	2.4	2	2.6	0.0006	0.36	0.31	1.2	2	2.3	0.0015
7	**17592**	0.57	0.06	1.8	0.0	0.06	0.00003	0.47	0.13	1.9	1.7	1.8	0.0008	-	-	-	-	-	-
8	84771	-	-	-	-	-	-	0.62	0.12	2.6	5.5	5.6	0.0017	0.2	0.14	3.5	0.07	0.2	0.0001
9	77036	-	-	-	-	-	-	4	0.26	2.9	6.5	6.8	0.0010	0.49	0.18	3.9	2.3	2.5	0.0006
10	51614	-	-	-	-	-	-	1.1	0.07	2.8	3	3.1	0.0008	0.85	0.08	1.9	0.67	0.8	0.0003
11	163367	**14**	9.5	1.4	1.4	10.90	0.00071	0.72	0.14	2.3	0.37	0.5	0.0002	-	-	-	-	-	-
12	30387	**11**	0.63	1.1	0.75	1.38	0.00011	0.91	0.19	1.7	1.2	1.4	0.0005	-	-	-	-	-	-
13	80025	**8.7**	1.9	2.5	1.5	3.40	0.00030	2	0.37	1.6	2.7	3.1	0.0009	-	-	-	-	-	-
14	**15580**	0.5	-0.02	4.4	0.69	0.67	0.00014	0.37	0.15	1	3.9	4.1	0.0030	-	-	-	-	-	-
15	37507	**7.1**	1.4	2.5	0.73	2.13	0.00022	0.95	0.15	1.9	1.3	1.5	0.0005	-	-	-	-	-	-
16	11668	0.57	0.09	0.89	0.69	0.78	0.00053	-	-	-	-	-	-	-	-	-	-	-	-
17	25973	**6.2**	0.44	2.5	0.71	1.15	0.00013	0.58	0.14	2.4	0.11	0.3	0.0001	-	-	-	-	-	-
18	32642	2.1	0.32	1.4	2.1	2.42	0.00069	3.4	0.29	0.69	0.37	0.7	0.0002	-	-	-	-	-	-
19	30937	1.3	0.31	1.6	2.8	3.11	0.00107	0.41	0.14	3.8	3.6	3.7	0.0009	-	-	-	-	-	-
20	117639	-	-	-	-	-	-	1.8	0.12	1.7	1.4	1.5	0.0004	3.2	0.97	3.2	1.1	2.1	0.0003
21	34903	**8.5**	2.2	2.1	2.5	4.70	0.00044	0.91	1.1	1.9	0.0	1.1	0.0004	-	-	-	-	-	-
22	275096	-	-	-	-	-	-	3.6	0.53	2.4	0.59	1.1	0.0002	1.2	0.19	2.1	1.2	1.4	0.0004
23	18123	-	-	-	-	-	-	1.6	0.08	1.2	0.26	0.3	0.0001	1.4	0.12	1.2	3.4	3.5	0.0014
24	19566	-	-	-	-	-	-	0.4	0.11	1.4	2	2.1	0.0012	0.29	0.26	0.76	2.2	2.5	0.0023
25	445123	-	-	-	-	-	-	3.9	0.88	2.9	2	2.9	0.0004	0.42	0.29	1.3	0.87	1.2	0.0007
26	11786	-	-	-	-	-	-	0.96	0.2	2.6	0.88	1.1	0.0003	0.36	0.02	0.95	1.6	1.6	0.0012
27	69828	-	-	-	-	-	-	0.9	0.33	2.2	0.0	0.3	0.0001	1.1	0.34	1.3	3.6	3.9	0.0016
28	39896	4.2	**270**	0.8	**6.5**	**276.5**	0.05530	1.6	0.15	2.2	1.6	1.8	0.0005	-	-	-	-	-	-

Table 3.1-2. Total and Leachable Radium Concentrations in Soil Samples (concluded)

Depth Interval (ft)	4-6						10-12					
Boring ID	Radium-226 (pCi/g)	Radium-226 (pCi/L)	Radium-228 (pCi/g)	Radium-228 (pCi/L)	Sum of Ra-226 & Ra-228 (pCi/L)	Leachable Ra/Total Ra (kg/L)	Radium-226 (pCi/g)	Radium-226 (pCi/L)	Radium-228 (pCi/g)	Radium-228 (pCi/L)	Sum of Ra-226 & Ra-228 (pCi/L)	Leachable Ra/Total Ra (kg/L)
UMTRCA Standard (pCi/g), WQCC (mg/L)	5 or 15 + bkg	-	-	-	30	-	5 or 15 + bkg	-	-	-	30	-
1	0.29	0.13	2.2	2.2	2.33	0.0009	0.23	0.06	1.6	0.22	0.28	0.0002
2	1.3	-0.22	2.7	2.1	1.88	0.0005	0.4	0.31	0.69	0.51	0.82	0.0008
3	-	-	-	-	-	-	-	-	-	-	-	-
4	1.7	-0.14	2.3	1.1	0.96	0.0002	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-
6	6.3	0.07	1.2	2.9	2.97	0.0004	0.35	0.08	1.1	0.18	0.26	0.0002
7	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	0.7	0.13	0.99	1.1	1.23	0.0008
9	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	0.27	0.08	0.47	1	1.08	0.0015
11	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	0.28	0.14	0.66	0.68	0.82	0.0008
13	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	0.21	0.1	1.5	0.47	0.57	0.0003
15	-	-	-	-	-	-	-	-	-	-	-	-
16	0.51	0.33	8.2	1.8	2.13	0.0002	-0.05	0.19	3.1	0.59	0.78	0.0002
17	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	0.24	0.16	2.3	0.0	0.16	0.0001
20	4.6	0.59	2.8	1.5	2.09	0.0003	0.31	0.11	1	0.55	0.66	0.0005
21	-	-	-	-	-	-	-	-	-	-	-	-
22	1.7	0.21	0.23	1.8	2.01	0.0010	0.57	0.49	1.3	1.3	1.79	0.0009
23	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	0.23	0.11	2.9	0.56	0.67	0.002
25	6.5	0.81	1	2.3	3.11	0.0004	0.37	0.19	2.1	0.93	1.12	0.0004
26	-	-	-	-	-	-	0.26	0.13	1.8	1.5	1.63	0.0008
27	-	-	-	-	-	-	0.19	0.29	1.2	2	2.29	0.001
28	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
Bolded values exceed their respective UMTRCA or WQCC standard

Table 3.1-3. Total and Leachable Uranium Concentrations in Soil Samples

		0-1			1-2			2-4			4-6			10-12		
Boring ID	**Field 1-min NaI Reading (cpm)**	Uranium (mg/kg)	Uranium (mg/L)	Leachable U/Total U (kg/L)	Uranium (mg/kg)	Uranium (mg/L)	Leachable U/Total U (kg/L)	Uranium (mg/kg)	Uranium (mg/L)	Leachable U/Total U (kg/L)	Uranium (mg/kg)	Uranium (mg/L)	Leachable U/Total U (kg/L)	Uranium (mg/kg)	Uranium (mg/L)	Leachable U/Total U (kg/L)
NMAC WQCC (mg/L)			0.03	-		0.03	-		0.03			0.03			0.03	
1	177782	-	-	-	34.90	**0.1640**	0.00470	35.10	**0.310**	0.00883	10.90	**0.0414**	0.0038	3.25	0.0006	0.0002
2	77991	-	-	-	14.90	**0.1280**	0.00859	5.04	0.0095	0.00188	7.78	0.0262	0.0034	0.89	0.0001 B	0.0001
3	37506	-	-	-	5.09	0.0068	0.00134	3.48	0.0053	0.00152	-	-	-	-	-	-
4	78532	-	-	-	3.73	0.0017	0.00046	2.12	0.0018	0.00085	4.31	0.0084	0.0019	-	-	-
5	238857	-	-	-	41.30	**0.1830**	0.00443	24.70	**0.1850**	0.00749	-	-	-	-	-	-
6	814825	-	-	-	5.28	0.0003 B	0.00006	1.29	0.0023	0.00178	19.10	0.0013	0.0001	0.86	0.0001 B	0.0001
7	17592	1.29	0.0014	0.00109	0.57	0.0003 B	0.00053	-	-	-	-	-	-	-	-	-
8	84771	-	-	-	9.48	0.0200	0.00211	5.91	0.0082	0.00139	-	-	-	2.18	0.0009	0.0004
9	77036	-	-	-	30.10	**0.0529**	0.00176	5.78	0.0227	0.00393	-	-	-	-	-	-
10	51614	-	-	-	9.80	**0.0303**	0.00309	10.60	0.0219	0.00207	-	-	-	1.45	0.0009	0.0006
11	163367	7.75	0.0198	0.00255	6.61	0.0066	0.00100	-	-	-	-	-	-	-	-	-
12	30387	7.79	0.0058	0.00074	11.40	0.0208	0.00182	-	-	-	-	-	-	0.62	0.0001 U	0.0002
13	80025	19.50	0.0250	0.00128	12.00	**0.0499**	0.00416	-	-	-	-	-	-	-	-	-
14	15580	4.36	0.0077	0.00177	3.51	0.005 U	0.00142	-	-	-	-	-	-	1.09	0.0031	0.003
15	37507	12.80	0.0072	0.00056	6.75	0.0254	0.00376	-	-	-	-	-	-	-	-	-
16	11668	0.94	0.0004 B	0.00043	-	-	-	-	-	-	0.86	0.0003 B	0.0003	0.54	0.0002 B	0.0003
17	25973	7.39	0.007 B	0.00095	5.45	0.0106	0.00194	-	-	-	-	-	-	-	-	-
18	32642	14.80	0.0246	0.00166	9.24	0.0133	0.00144	-	-	-	-	-	-	-	-	-
19	30937	18.80	0.0251	0.00134	8.83	0.0145	0.00164	-	-	-	-	-	-	2.88	0.0073	0.003
20	117639	-	-	-	30.00	**0.0761**	0.00254	10.70	0.0281	0.00263	9.50	0.0196	0.0021	2.43	0.0054	0.002
21	34903	20.90	0.0066	0.00032	15.10	**0.1210**	0.00801	-	-	-	-	-	-	-	-	-
22	275096	-	-	-	67.50	**0.1440**	0.00213	27.40	**0.0652**	0.00238	17.80	**0.1080**	0.0061	12.00	0.0210	0.002
23	18123	-	-	-	4.24	0.0025	0.00059	4.17	0.0026	0.00062	-	-	-	-	-	-
24	19566	-	-	-	1.00	0.0011	0.00110	0.58	0.0001 B	0.00017	-	-	-	0.58	0.0002 B	0.0003
25	445123	-	-	-	17.00	**0.0400**	0.00235	21.60	**0.0933**	0.00432	1.67	**0.0585**	0.0350	4.93	0.0052	0.001
26	11786	-	-	-	0.52	0.005 U	0.00962	0.74	0.0001 U	0.00014	-	-	-	0.61	0.0001 B	0.0002
27	69828	-	-	-	51.10	**0.3990**	0.00781	29.50	**0.294**	0.00997	-	-	-	3.25	0.0036	0.001
28	39896	22.70	**0.2310**	0.01018	29.40	**0.1170**	0.00398	-	-	-	-	-	-	-	-	-

Notes:
Bolded values exceed their respective UMTRCA or WQCC standard
Laboratory qualifiers are:
B = Analyte detected in blank above lower limit of detection
U = Not detected above the method detection limit

Table 3.2-1. Total Metals Concentrations in Soil Samples

Depth Interval (ft)	0-1						1-2						2-4						4-6						10-12					
Metals Concentration (mg/kg)	As	Ba	Mo	Se	Ag	Va	As	Ba	Mo	Se	Ag	Va	As	Ba	Mo	Se	Ag	Va	As	Ba	Mo	Se	Ag	Va	As	Ba	Mo	Se	Ag	Va
NMED SSL (mg/kg)	3.9	15600	391	391	391	78.2	3.9	15600	391	391	391	78.2	3.9	15600	391	391	391	78.2	3.9	15600	391	391	391	78.2	3.9	15600	391	391	391	78.2
Boring ID																														
1	-	-	-	-	-	-	**5.4**	52.1	2 B	1.40	1 U	17.8	**6.3**	85.0	1 B	0.73	1 U	16.7	**3.9**	62.8	1 U	0.13 B	1 U	14.3	3.3	60.0	3 B	0.19 B	1 U	13.7
2	-	-	-	-	-	-	**6.9**	80.8	1 U	0.7	1 U	27.0	**7.4**	70.3	1 U	0.61	1 U	21.6	**5.2**	73.0	1 U	0.51	1 U	20.1	3.5	62.9	2 B	0.25 B	1 U	13.6
3	-	-	-	-	-	-	**8.0**	94.7	1 U	0.86	1 U	30.1	**6.4**	74.3	1 U	0.05 B	1 U	18.9	-	-	-	-	-	-	-	-	-	-	1 U	-
4	-	-	-	-	-	-	**10.1**	101	1 B	0.37	2 U	40	**6.9**	90.4	1 U	0.52	1 U	24.1	**9.0**	111	1 U	0.85	1 U	34.0	-	-	-	-	-	-
5	-	-	-	-	-	-	**6.0**	51.1	3 B	0.78	1 U	20.4	**4.0**	83.8	1 B	1.49	1 U	15.9	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	**4.0**	59.3	1 B	0.49	1 U	11.7	3.7	59.8	1 U	3.05	1 U	12.8	**5.5**	317	1 U	3.86	1 U	16.3	**6.0**	63.7	3 B	0.40	1 U	23.9
7	**4.6**	72.30	1 U	0.60	1 U	20.6	**5.0**	73.4	1 U	0.05 U	1 U	16.5	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**	-	**-**
8	-	-	-	-	-	-	**6.4**	64.6	7	4.23	1 U	17.8	**4.9**	74.6	2 B	1.45	1 U	16.8	-	-	-	-	-	-	**7.9**	134	2 B	0.60	1 U	36.6
9	-	-	-	-	-	-	**9.8**	100	3 B	2.87	1 U	36.2	**5.6**	69.0	1 B	0.50	1 U	15.2	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	**5.6**	69.0	3 B	0.47	1 U	19.4	**9.2**	122	1 U	2.0	1 U	45.0	-	-	-	-	-	-	3.2	45.0	1 B	0.16 B	1 U	10.7
11	3.3	41.9	5 B	2.16	1 U	17.6	**5.7**	77.6	6	2.80	1 U	19.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	**4.8**	84.3	1 U	1.80	1 U	23.80	**7.4**	84.6	2 B	0.90	1 U	21.2	-	-	-	-	-	-	-	-	-	-	-	-	3.4	62.5	1 U	0.16 B	1 U	12.5
13	**7.2**	76.4	12	2.58	1 U	24.4	**6.0**	72.6	7	1.22	1 U	18.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	**5.0**	63.0	2 B	0.44	1 U	17.9	**5.6**	56.5	2 B	0.05 U	1 U	14.3	-	-	-	-	-	-	-	-	-	-	-	-	2.8	43.9	1 U	0.21 B	1 U	10.5
15	**6.9**	83.7	5 B	2.80	1 U	30.3	**6.2**	153	4 B	0.56	1 U	16.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	**5.9**	73.0	1 U	0.72	1 U	16.5	-	-	-	-	-	-	-	-	-	-	-	-	**6.0**	66.9	1 U	0.31	1 U	20.9	2.7	37.4	1 B	0.12 B	1 U	9.6
17	**6.5**	65.5	3 B	0.56	1 U	26.9	**6.3**	60.8	3 B	0.11	1 U	16.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	**10.8**	128	5 B	0.59	1 U	43.2	**7.8**	140	2 B	1.79	1 U	32.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	**5.4**	78.0	1 B	0.10 B	1 U	14.3	**4.6**	70.9	1 U	0.05 U	1 U	10.8	-	-	-	-	-	-	-	-	-	-	-	-	3.1	54.1	1 U	0.16 B	1 U	12.3
20	-	-	-	-	-	-	**10.6**	165	5	3.07	2 U	54	**9.0**	140	5 B	1.33	1 U	35.4	**6.0**	91.4	2 B	1.58	1 U	24.6	2.9	59.4	2 B	0.20 B	1 U	12.3
21	**6.0**	197	8	15.10	1 U	25.2	**10.0**	80.9	8	0.93	1 U	28.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	**6.6**	68.8	38	15.30	1 U	18.2	**6.5**	78.1	14	4.34	1 U	14.9	**6.3**	94.1	5	1.10	1 U	19.7	3.4	77.2	3 B	0.99	1 U	15.0
23	-	-	-	-	-	-	**4.6**	61.7	1 U	0.77	2 U	18.2	**6.1**	64.3	0.01 U	0.05 U	1 U	18.7	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	**4.8**	55.9	1 U	0.30	1 U	13.8	**3.8**	56.9	0.01 U	0.05 U	1 U	15.3	-	-	-	-	-	-	3.5	82.4	2 B	0.17 B	1 U	18.2
25	-	-	-	-	-	-	3.7	106	12	1.35	1 U	12.1	**5.4**	61.6	9	2.27	1 U	16.7	**6.4**	125	1 U	1.07	1 U	32.4	3.5	53.0	5 B	0.63	1 U	13.3
26	-	-	-	-	-	-	**4.3**	80.8	1 U	0.05 B	1 U	19.6	**5.6**	89.1	1 U	0.05 U	1 U	22.3	-	-	-	-	-	-	3.2	124	1 B	0.16 B	1 U	16.6
27	-	-	-	-	-	-	**4.9**	82.8	8	1.72	1 U	15.3	**5.6**	61.5	8	0.27 B	1 U	18.0	-	-	-	-	-	-	3.3	64.4	4 B	0.17 B	1 U	16.5
28	**6.5**	54.7	12	4.47	1 U	18.2	**5.6**	57.2	10	0.63	1 U	13.8	-	-	-	-	-	-	-	-	-	-	-	-	**-**	-	-	-	-	-

Notes:
Bolded values exceed their respective NMED SSLs
Laboratory qualifiers are:
B = Analyte detected in blank above lower limit of detection
U = Not detected above the method detection limit

Table 3.2-2. Concentrations of Leachable Metals in Soil Samples

Depth Interval (ft)	0-1						1-2						2-4					
Metals Concentration (mg/L)	As	Ba	Mo	Se	Ag	Va	As	Ba	Mo	Se	Ag	Va	As	Ba	Mo	Se	Ag	Va
NMAC WQCC (mg/L)	0.1	1.0	1.0[a]	0.05	0.05	NA	0.1	1.0	1.0[a]	0.05	0.05	NA	0.1	1.0	1.0[a]	0.05	0.05	NA
Boring ID																		
1	-	-	-	-	-	-	0.0021	0.009 B	0.03 B	**0.0556**	5E-5 U	0.005 U	0.0014	0.016 B	0.01 B	**0.0522**	5E-5 U	0.005 U
2	-	-	-	-	-	-	0.0009 B	0.021	0.01 U	0.0041	5E-5 U	0.005 U	0.0008 B	0.020	0.01 U	0.0004 B	5E-5 U	0.005 U
3	-	-	-	-	-	-	0.0013	0.021	0.01 U	0.0007	5E-5 U	0.005 U	0.0007 B	0.008 B	0.01 U	0.0005	5E-5 U	0.005 U
4	-	-	-	-	-	-	0.0011	0.014 B	0.01 U	0.0014	5E-5 U	0.005 U	0.0009 B	0.026	0.01 U	0.0006	5E-5 U	0.005 U
5	-	-	-	-	-	-	0.0011	0.017 B	0.05 B	0.0212	5E-5 U	0.005 U	0.0005 B	0.023	0.03 B	0.0240	5E-5 U	0.005 U
6	-	-	-	-	-	-	0.0011	0.010 B	0.01 U	0.0001 U	5E-5 U	0.005 U	0.0008 B	0.043	0.01 U	**0.0628**	5E-5 U	0.005 U
7	0.0018	0.014 B	0.01 U	0.0001 U	5E-5 U	0.005 U	0.0010	0.011 B	0.01 U	0.0001 B	5E-5 U	0.005 U	-	-	-	-	-	-
8	-	-	-	-	-	-	0.0009 B	0.014 B	0.12	**0.1530**	5E-5 U	0.005 U	0.0009 B	0.005 B	0.04 B	0.022	5E-5 U	0.005 U
9	-	-	-	-	-	-	0.0009 B	0.011 B	0.04 B	0.0072	5E-5 U	0.005 U	0.0007 B	0.022	0.01 B	0.0020	5E-5 U	0.005 U
10	-	-	-	-	-	-	0.0010 B	0.023	0.03 B	0.0006	5E-5 U	0.005 U	0.0006 B	0.014	0.01 B	0.0027	5E-5 U	0.005 U
11	0.0055	0.029	0.07	0.0204	5E-5 U	0.005 U	0.0005 U	0.028	0.06	**0.0502**	5E-5 U	0.005 U	-	-	-	-	-	-
12	0.0023	0.018 B	0.01 U	0.0011	5E-5 U	0.007 B	0.0011	0.022	0.01 B	0.0012	5E-5 U	0.005 U	-	-	-	-	-	-
13	0.0013	0.034	0.10	0.0185	5E-5 U	0.005 U	0.0008 B	0.026	0.13	0.0229	5E-5 U	0.005 U	-	-	-	-	-	-
14	0.0013	0.018 B	0.01 B	0.0003 B	5E-5 U	0.005 B	0.0010	0.014 B	0.03 B	0.0006	0.00014 B	0.005 B	-	-	-	-	-	-
15	0.0069	0.024	0.02 B	0.0096	5E-5 U	0.009 B	0.0014	0.007 B	0.07	0.0040	5E-5 U	0.005 U	-	-	-	-	-	-
16	0.0024	0.011 B	0.01 U	0.0001 U	5E-5 U	0.005 B	-	-	-	-	-	-	-	-	-	-	-	-
17	0.0042	0.012 B	0.01 B	0.0035	5E-5 U	0.007 B	0.0013	0.014 B	0.05	0.0039	5E-5 U	0.005 U	-	-	-	-	-	-
18	0.0008 B	0.022	0.05	0.0068	5E-5 U	0.005 U	0.0005 U	0.027	0.03 B	0.0149	5E-5 U	0.005 U	-	-	-	-	-	-
19	0.0013	0.071	0.01 U	0.0006	5E-5 U	0.005 U	0.0006 B	0.056	0.01 U	0.0005 B	5E-5 U	0.005 U	-	-	-	-	-	-
20	-	-	-	-	-	-	0.0009 B	0.014 B	0.10	0.0489	5E-5 U	0.005 U	0.0014	0.047	0.07	0.0086	5E-5 U	0.005 U
21	0.0036	0.116	0.02 B	0.0106	5E-5 U	0.005 U	0.0031	0.328	0.07	0.0025	5E-5 U	0.005 U	-	-	-	-	-	-
22	-	-	-	-	-	-	0.0006 B	0.038	0.90	**0.2460**	5E-5 U	0.005 U	0.0008 B	0.015 B	0.33	**0.1130**	5E-5 U	0.005 U
23	-	-	-	-	-	-	0.0023	0.005 B	0.01 U	0.0002 B	5E-5 U	0.005 U	0.0020	0.007 B	0.01 U	0.0003 B	5E-5 U	0.005 U
24	-	-	-	-	-	-	0.0009 B	0.020 B	0.01 U	0.0001 U	5E-5 U	0.005 U	0.0026	0.01 B	0.01 U	0.0001 B	5E-5 U	0.005 U
25	-	-	-	-	-	-	0.0012	0.113	0.17	0.0326	5E-5 U	0.005 U	0.0006 B	0.034	0.27	**0.1130**	5E-5 U	0.005 U
26	-	-	-	-	-	-	0.0006 B	0.007 B	0.01 U	0.0001 B	5E-5 U	0.005 U	0.0015	0.011 B	0.01 U	0.0001 B	5E-5 U	0.005 U
27	-	-	-	-	-	-	0.0006 B	0.041	0.09	0.0077	5E-5 U	0.005 U	0.0008 B	0.013 B	0.23	0.0084	5E-5 U	0.005 U
28	0.0073	**1.280**	0.01 U	0.0092	0.00006 B	0.023 B	0.0016	0.015 B	0.10	0.0117	5E-5 U	0.005 U	-	-	-	-	-	-

Table 3.2-2. Concentrations of Leachable Metals in Soil Samples (concluded)

Depth Interval (ft)	4-6						10-12					
Boring ID	As (mg/L)	Ba (mg/L)	Mo (mg/L)	Se (mg/L)	Ag (mg/L)	Va (mg/L)	As (mg/L)	Ba (mg/L)	Mo (mg/L)	Se (mg/L)	Ag (mg/L)	Va (mg/L)
NMAC WQCC (mg/L)	0.1	1.0	1.0[a]	0.05	0.05	NA	0.1	1.0	1.0[a]	0.05	0.05	NA
1	0.0008 B	0.014 B	0.01 U	0.0100	5E-5 U	0.005 U	0.0006 B	0.018 B	0.01 U	0.19 B	5E-5 U	0.005 U
2	0.0007 B	0.026	0.01 U	0.0007	5E-5 U	0.005 U	0.0007 B	0.018 B	0.01 U	0.0014	5E-5 U	0.005 U
3	-	-	-	-	-	-	-	-	-	-	-	-
4	0.0011	0.024	0.01 U	0.0007	5E-5 U	0.005 U	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-
6	0.0012	0.022	0.01 U	0.0140	5E-5 U	0.005 U	0.0010	0.019 B	0.01 U	0.0043	5E-5 U	0.005 U
7	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	0.0005 U	0.034	0.01 U	0.0013	5E-5 U	0.005 U
9	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	0.0008 B	0.029	0.01 U	0.0003 B	5E-5 U	0.005 U
11	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	0.0009 B	0.022	0.01 U	0.0002 B	5E-5 U	0.005 U
13	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	0.0010	0.044	0.01 U	0.21 B	5E-5 U	0.005 U
15	-	-	-	-	-	-	-	-	-	-	-	-
16	0.0012	0.035	0.01 U	0.0006	5E-5 U	0.005 U	0.0009 B	0.020	0.01 U	0.0001 U	5E-5 U	0.005 B
17	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	0.0017	0.031	0.01 U	0.0006	5E-5 U	0.005 U
20	0.0013	0.020	0.02 B	0.0036	5E-5 U	0.005 U	0.0018	0.033	0.01 U	0.0007	5E-5 U	0.005 U
21	-	-	-	-	-	-	-	-	-	-	-	-
22	0.0014	0.022	0.10	**0.0535**	5E-5 U	0.005 U	0.0023	0.055	0.06	0.0347	5E-5 U	0.005 U
23	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	0.0017	0.028	0.01 U	0.0004 B	5E-5 U	0.005 U
25	0.0010 B	0.131	0.16	**0.0570**	5E-5 U	0.005 U	0.0020	0.028	0.04 B	0.0244	5E-5 U	0.005 U
26	-	-	-	-	-	-	0.0014	0.023	0.01 U	0.16 B	5E-5 U	0.007 B
27	-	-	-	-	-	-	0.0019	0.049	0.08	0.17 B	5E-5 U	0.005 U
28	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
Bolded values exceed their respective NMAC WQCC Standards
Laboratory qualifiers are:
B = Analyte detected in blank above lower limit of detection
U = Not detected above the method detection limit

Table 3.3-1. Concentrations of Leachable Major Ions in Soil Samples

Depth Interval (ft)	0-1				1-2				2-4			
Boring ID	Chloride (mg/L)	Nitrate/Nitrite (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Nitrate/Nitrite (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Nitrate/Nitrite (mg/L)	TDS (mg/L)	Sulfate (mg/L)
NMAC WQCC (mg/L)	250.0	10.0	1000.0	600.0	250.0	10.0	1000.0	600.0	250.0	10.0	1000.0	600.0
1	-	-	-	-	7	0.91 H1	320	110	3 B	0.11 H1	170	40 B
2	-	-	-	-	9	2.72	580	350	3 B	0.42	200	110
3	-	-	-	-	13	2.69	610	370	3 B	0.62 H1	280	170
4	-	-	-	-	18	6.55 H1	430	210	6	0.76	440	280
5	-	-	-	-	2 B	2.04 H1	190	90	3 B	0.14	220	70
6	-	-	-	-	3 B	1.08	120	20 B	5 B	1.64 HD	210	110
7	3 B	0.44	150	30 B	2 B	0.12 H1	110	20 B	-	-	-	-
8	-	-	-	-	10	2.48	320	80	3 B	0.24	140HC	50
9	-	-	-	-	5 B	2.13	280	90	3 B	1.81 HD	150	50 B
10	-	-	-	-	3 B	3.20	170	30 B	2 B	0.28	310	170
11	2 B	2.41	430	260	3 B	0.92	240 HC	130	-	-	-	-
12	2 B	1.38	120 HC	20 B	2 B	4.19 HD	120	10 B	-	-	-	-
13	3 B	2.72	230	120	3 B	3.82	320	130	-	-	-	-
14	4 B	2.77	240	40 B	3 B	0.30 H1	180	40 B	-	-	-	-
15	3 B	3.89 HD	180	30 B	4 B	3.22	250	60	-	-	-	-
16	3 B	0.56	150	30 B	-	-	-	-	-	-	-	-
17	2 B	1.31 H1	130	20 B	5 B	6.20 H1	300	60	-	-	-	-
18	3 B	1.80 H1	230	110	4 B	1.20	330	190	-	-	-	-
19	1 U	0.23 H1	170	90	2 B	5.43 H1	210	120	-	-	-	-
20	-	-	-	-	7	3.11	560	350	6	2.07 HD	280	90
21	2 B	3.98 HD	140	20 B	2 B	0.88	80	10 B	-	-	-	-
22	-	-	-	-	2 B	2.65 HD	80	20 B	3 B	1.79	80	20 B
23	-	-	-	-	3 B	1.64	140	10 B	3 B	1.90 H1	160	20 B
24	-	-	-	-	2 B	0.34	110	20 B	4 B	2.55 HD	170	20 B
25	-	-	-	-	2 B	3.87 HD	90	20 B	2 B	1.41	100	20 B
26	-	-	-	-	2 B	5.50 HD	130	20 B	2 B	0.26 H1	140	30 B
27	-	-	-	-	2 B	1.92 HD	120	10 B	2 B	0.71 H1	170.00	50 B
28	3 B	9.9 HC	240 HC	50 U	2 B	0.48 H1	110	20 B	-	-	-	-

Table 3.3-1. Concentrations of Leachable Major Ions in Soil Samples (concluded)

Depth Interval (ft)	4-6				10-12			
Boring ID	Chloride (mg/L)	Nitrate/Nitrite (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Nitrate/Nitrite (mg/L)	TDS (mg/L)	Sulfate (mg/L)
NMAC WQCC (mg/L)	250.0	10.0	1000.0	600.0	250.0	10.0	1000.0	600.0
1	1 B	1 B	1 B	1 B	2 B	0.04 B	120	18
2	2 B	2 B	2 B	2 B	2 B	0.03 B	90	12
3	-	-	-	-	-	-	-	-
4	2 B	2 B	2 B	2 B	-	-	-	-
5	-	-	-	-	-	-	-	-
6	2 B	2 B	2 B	2 B	1 B	0.05 B	100	18
7	-	-	-	-	-	-	-	-
8	-	-	-	-	1 B	0.04 B	750	490
9	-	-	-	-	-	-	-	-
10	-	-	-	-	1 B	0.05 B	80	21
11	-	-	-	-	-	-	-	-
12	-	-	-	-	2 B	0.04 B	100	13
13	-	-	-	-	-	-	-	-
14	-	-	-	-	1 B	0.03 B	80	18
15	-	-	-	-	-	-	-	-
16	24	24	24	24	2 B	0.04 B	70	8
17	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-
19	-	-	-	-	2 B	0.02 B	130	19
20	2 B	2 B	2 B	2 B	2 B	0.03 B	120	16
21	-	-	-	-	-	-	-	-
22	2 B	2 B	2 B	2 B	1 B	0.30	80	9
23	-	-	-	-	-	-	-	-
24	-	-	-	-	5	0.05 B	100	18
25	2 B	2 B	2 B	2 B	2 B	0.03 B	110	13
26	-	-	-	-	6	0.12	110	13
27	-	-	-	-	1 B	0.05 B	90	14
28	-	-	-	-	-	-	-	-

Notes:
Bolded values exceed their respective NMAC WQCC Standards
Laboratory qualifiers are:
B = Analyte detected in blank above lower limit of detection
H1 =
HC = Initial analysis within holding time. Re-analysis was past holding time, which was required due to a quality control failure during the initial analysis.
HD = No Pre-extraction holding time is specified in the method. Post-extraction hold time was met.
U = Not detected above the method detection limit

INTERNAL CORRESPONDENCE

QUIVIRA MINING COMPANY

(UNIT)

TO A. Gebeau

FROM P. Luthiger

DATE June 8, 1993

SUBJECT Mine Reclamation Borrow Areas

In preparation for the Section 35 mine reclamation earthwork, several soil samples were collected from the proposed borrow area and analyzed for radium 226 content. This is being performed to ensure that clean alluvial cover material is being used.

A total of twelve (12) soil samples were collected from the borrow area; with an average radium 226 content of 3.2 picocuries per gram (pCi/g). The maximum concentration of 5.2 pCi/g was located just northwest of the waste pad south of the fenceline.

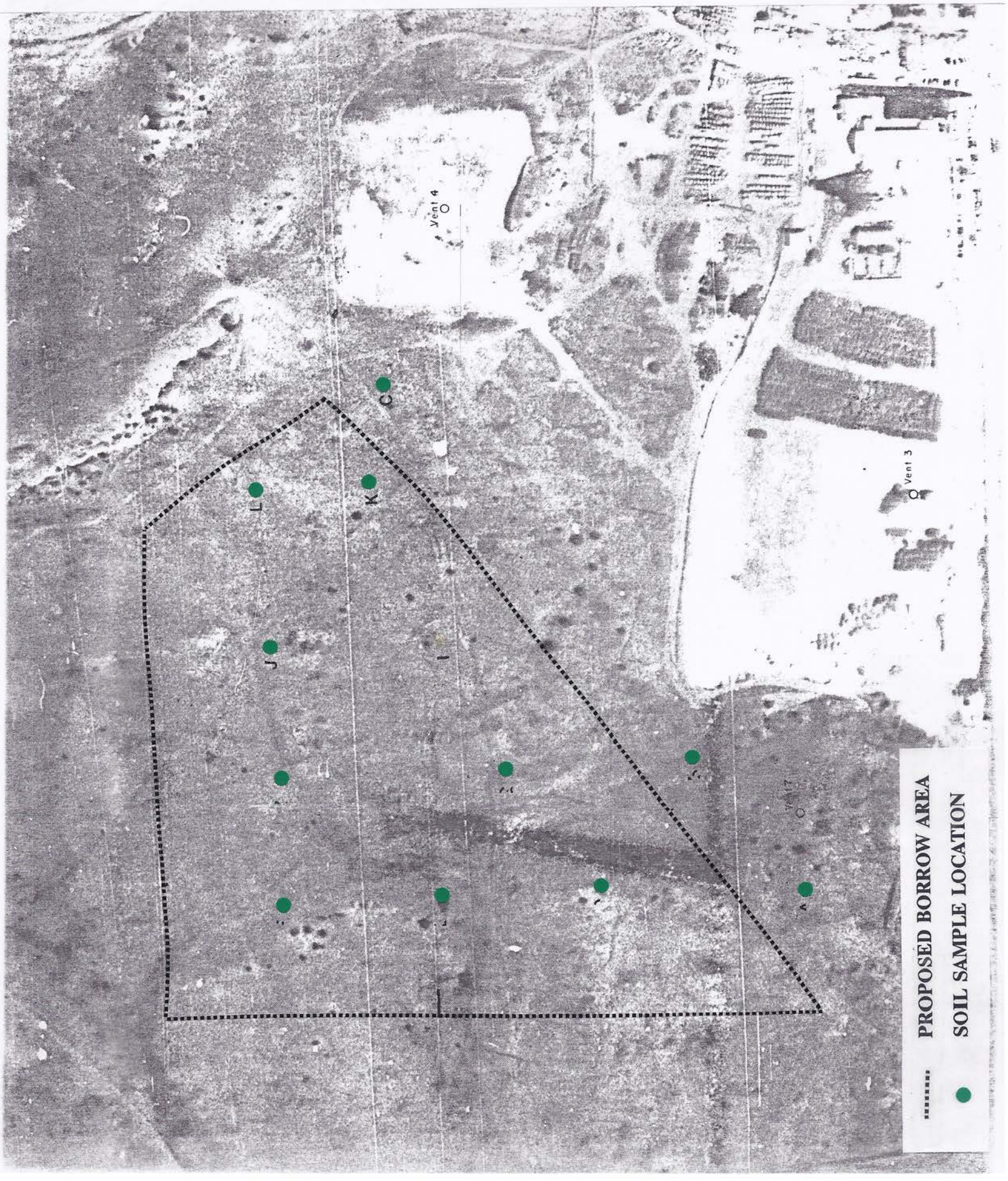
A map delineating the borrow area and sampling points, along with the sample results are attached.

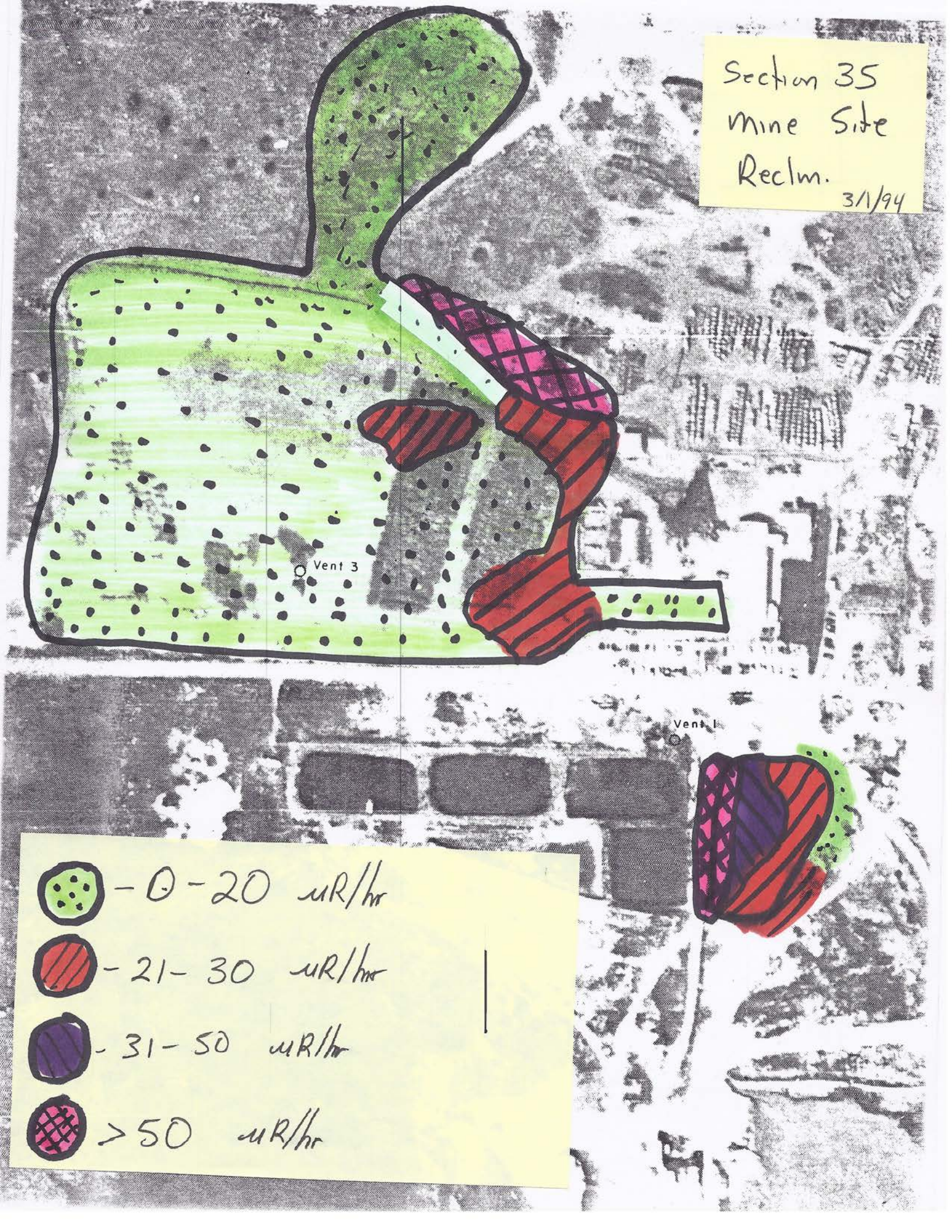
From the sampling, it appears that the borrow area will be acceptable for use as cover material for Section 35.

Peter Luthiger

xc: B. Ferdinand
file

SECTION 35 MINE
BORROW AREA SAMPLING




Section 35
Mine Site
Reclm.
3/1/94
Vent 3
Vent 1
- 0 - 20 uR/hr
- 21 - 30 uR/hr
- 31 - 50 uR/hr
> 50 uR/hr

For complete report see Reclamation (Seeding) files Report Dated 5-11-1999

QUIVIRA MINING COMPANY

POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

TO: Terry Fletcher **FROM: R. D. Powell**

Date: 4-13-99 **SUBJECT: Sec. 35 Pond Acreage**

Estimated disturbed areas at Section 35 are as follows:

Section 35 Mine Ponds - 5 acres (includes area disturbed by sand plant.)

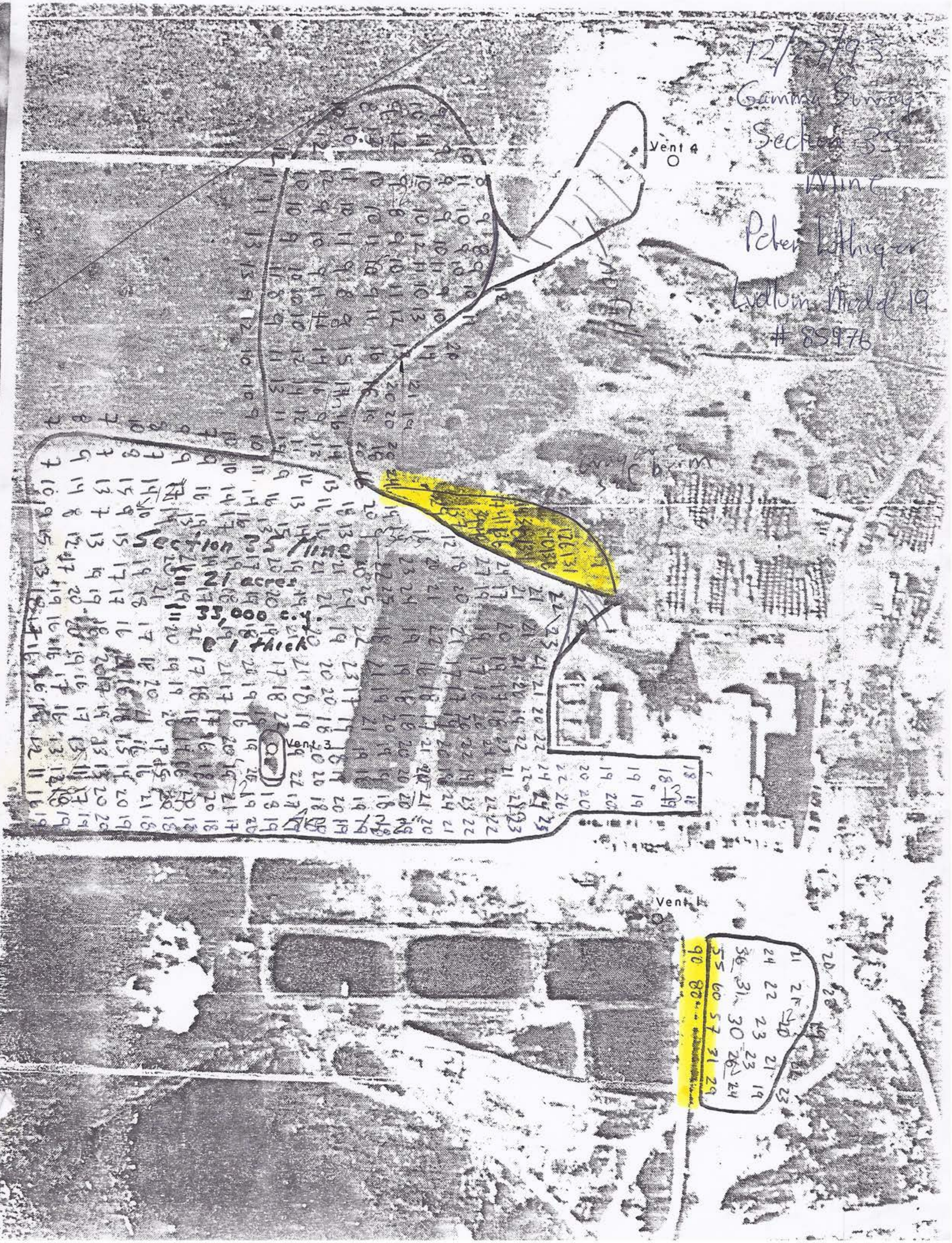
Section 35 IX Ponds - 16 acres

TOTAL ACREAGE = 21 acres

This was confirmed by comparing the figures I obtained to the Photo-map of the area.

Acreage of Sec 36/Mill 8.0 -
Acreage of Sec 36/Rd 7 12.5
20.5 Acres.

cc\file


12/27/93
Gamma Survey
Section 35
Mine
Ludlum Model 19
85976
Vent 4
Section 35 Mine
21 acres
33,000 c.y.
@ 1' thick
Vent 3
Vent 1

KERR-McGEE NUCLEAR CORPORATION

INTERNAL CORRESPONDENCE

TO Bill Ferdinand

DATE June 25, 1979

FROM Brad Gallimore

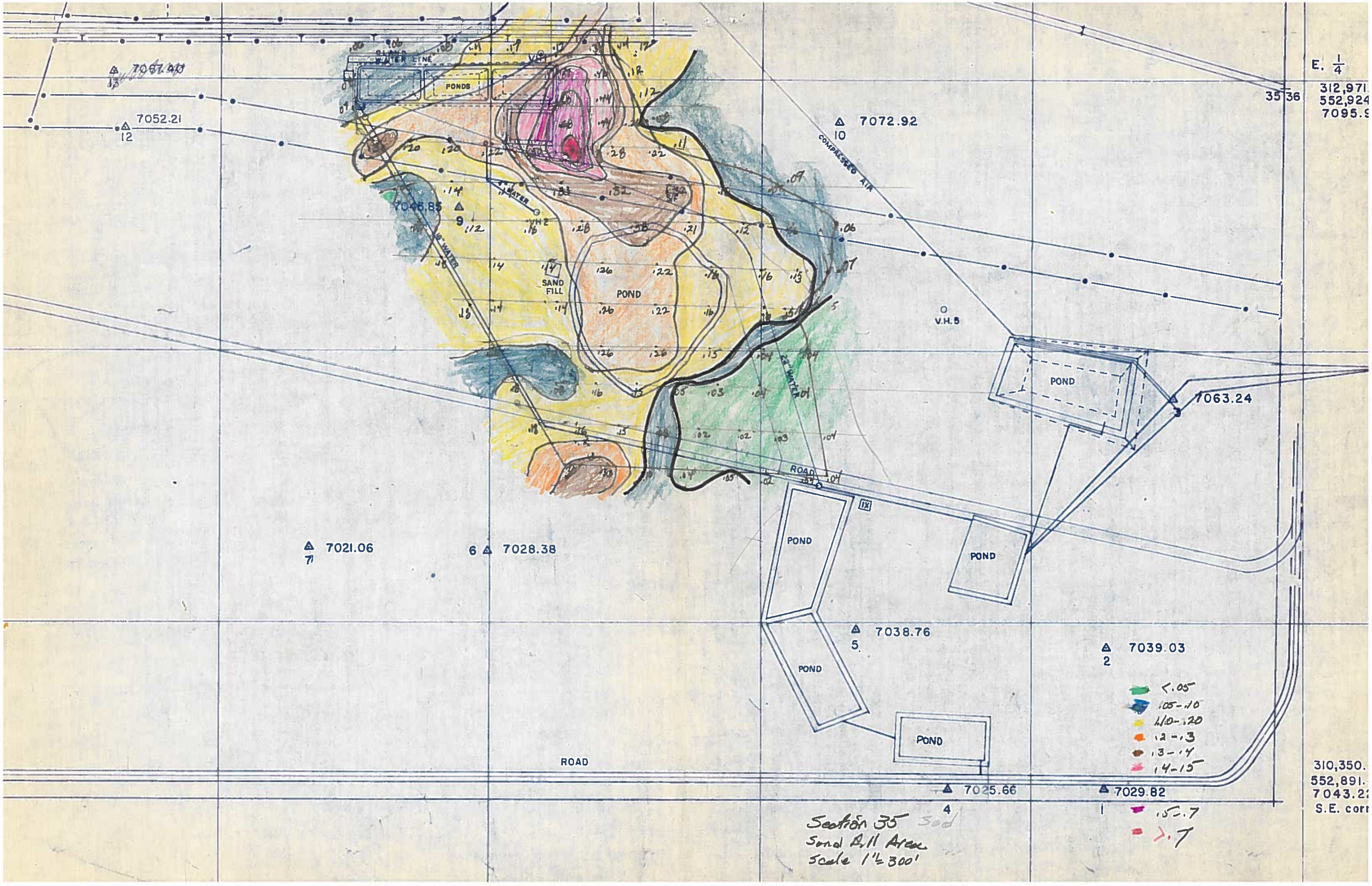
SUBJECT Gamma Survey

On the 21st gamma readings were taken at 150' intervals over the old sandfill pond between the IX WATER TREATMENT plant and Section 35 Mine.

The purpose of the survey was to determine gamma radiation levels prior to reclamation.

Brad Gallimore

Brad Gallimore


7067.90
7052.21
12
PONDS
SLAND WATER LINE
VH1
7072.92
10
COMPRESSED AIR
35 36
E. 1/4
312,971
552,924
7095.9
7045.85
9
SAND FILL
POND
V.H.5
POND
7063.24
ROAD
POND
POND
POND
7021.06
7
6 7028.38
7038.76
5
7039.03
2
POND
ROAD
7025.66
4
7029.82
1
<.05
.05-.10
.10-.20
.2-.3
.3-.4
.4-.5
.5-.7
>.7
310,350.
552,891.
7043.22
S.E. corn
Section 35
Sand Fill Area
Scale 1"=300'

Rio Algom Mining LLC

November 8, 2005

Ms. Mary Ann Menetrey, Program Manager
MECS-GWQB
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502

Re: **Section 35 and 36 Mine Dewatering Project**

Dear Ms. Menetrey,

In response to your May 17, 2005 letter, please find enclosed the site characterization report for the Section 35 and 36 Mine dewatering project. This study, which was conducted by Environmental Restoration Group, Inc., provides the findings of the characterization work associated with the mine dewatering activities performed under Discharge Permit DP-67.

Rio Algom would like to convene a meeting at NMEDs convenience for the purpose of facilitating understanding of the information in the report and to discuss the path forward on termination of the discharge permit.

Please contact me at the address below or at 505-287-8851, extension 205 on NMED availability for such a meeting.

Regards,

Peter Luthiger
Corporate Manager, Radiation
Safety and Environmental Affairs

xc: T. Fletcher
R. Foster (BHPB-Houston)
R. Jones (KMG)
K. Myers (NMED-GWPB)
file

P.O. Box 218, Grants, NM USA 87020 - Tel: 505.287.8851 - Fax: 505.285.5550

RIO ALGOM MINING LLC
AMBROSIA LAKE FACILITY

Characterization Report For the Section 35 and 36 Mine Drainage

November 8, 2005

Characterization Report for the Section 35 and 36 Mine Drainage

November 2005

Rio Algom Mining, LLC
P. O. Box 218
Grants, New Mexico 87020

Prepared by:

Environmental Restoration Group, Inc.
8809 Washington Ave. NE, Suite 150
Albuquerque, NM 87113

Table of Contents

1.0 Introduction

Environmental Restoration Group, Inc (ERG) has been retained to characterize land areas affected by the historical Section 35 and 36 Mine dewatering activity. Rio Algom Mining LLC (RAML) identified elevated uranium and radium concentrations in surface soils in the vicinity of the mines. The affected land area lies south and southwest of the Section 35 and 36 Mines. Potential impacts occurred via mine dewatering between 1957 and 1990. In 1976 an ion exchange plant was installed to recover uranium from the Section 35 discharge. In 1979 water from Section 36 was treated for radium in a settling pond prior to discharge. Vegetation cover in the impacted area shows a marked increase, particularly salt cedars, and clearly delineates the area used to manage the historic mine dewatering by flood irrigation practices. Impacts are most likely to co-occur in the vegetated areas, except where these areas are covered by blowsands.

On April 12, 2005 RAML notified the State Ground Water Quality Bureau of a potential release of hazardous substances in this area and committed to conduct a study to characterize the nature and extent of the release. This report contains the results of that characterization.

For purposes of estimating the nature and extent of impacts, thresholds for radium-226 were set at 5 picoCuries per gram (pCi/g) in the first 15-centimeter (cm) layer of soil averaged over a 100 square meter (m^2) area and 15 pCi/g averaged over a 100 m^2 area in any 15-cm layer thereafter. No measurement or accounting of natural background radium-226 concentrations in soils has been done in this analysis.

The surface radiation surveys, correlated to measured soil radium-226 concentrations, provide an accurate method for estimating the aerial extent of impacts. However, because of the large size of the area, the number of subsurface samples required to provide a similar level of accuracy for the vertical extent was not practical. A reasonable effort at defining the vertical extent has been made, based on best professional judgment and past experience on other characterization projects.

2.0 Summary of Soil Characterization

The stages of the soil characterization were as follows:

- Gamma survey,
- Gamma-soil correlation, and
- Limited intrusive investigation.

Each stage is described below.

2.1 Gamma Survey

In May and June 2005 ERG conducted a gamma survey of land areas associated with the historical Section 35 and 36 Mine dewatering. The survey covered areas in the State of New Mexico, Township 13 North, Range 9 West, Sections 2, 3, 4, and 11; and Township 14 North, Range 9 West, Section 35. The radiological data-mapping system consisted of two Trimble ProXRS global positioning systems (GPS), each paired with a digital ratemeter/scaler (Ludlum Model 2221) and 2-inch by 2-inch sodium iodide (NaI) detector (Ludlum Model 44-10). The Ludlum Model 2221 was operated in ratemeter mode, in which counts are automatically displayed at two-second intervals. The radiological count-rate data were automatically paired with differentially-corrected location coordinates at the time the count rate is recorded using GPS units. The survey was conducted on foot by two technicians, with a detector separation of approximately 50 feet (ft) at

18 inches (in.) above the ground surface. The detector separation increased to approximately 100 ft in land areas exhibiting count rates indicative of unaffected areas (i.e., locations away from the project area). Thick vegetation largely precluded the ability of field personnel to maintain exact detector spacing.

Figure 2.1.-1 depicts the gamma radiation readings observed during the survey. Gross gamma readings are presented in counts per minute (cpm) in the following ranges: less than 29,000 cpm, 29,001 to 40,000 cpm, 40,001 to 50,000 cpm, 50,001 to 100,000 cpm, and greater than 100,000 cpm. The total area of the survey is approximately 1080 acres. No data were collected in the white areas shown on Figure 2.2-1. Obstructions such as trees and/or existing excavations precluded surveying these areas.

Instrumentation calibration and function check data for the instruments used in the GPS-gamma surveys are presented in Appendix A.

2.2 Gamma-Soil Correlation Study

Field personnel collected 40 co-located static gamma counts and surface soil samples to develop a correlation between radium-226 concentrations in soil and the gross gamma count rate. Care was taken to sample areas where gamma count rates were uniform over a 9-foot (ft) diameter circular area. The correlation study was conducted between June 27 and July 1, 2005.

An unshielded 2-in. by 2-in. NaI detector having the same detection properties as those used in the gamma scanning survey was used for the correlation. A 1-minute integrated count was taken at each of the 40 locations with the detector held at 18 in. above the ground surface. A surface to 6-in. deep representative soil sample was then taken at each location, directly beneath where the detector was held.

The samples were analyzed for radium-226 and uranium-238 via gamma spectroscopy methods at General Engineering Laboratories LLC (GEL). GEL is a vendor laboratory located in Charleston, South Carolina. The laboratory analytical data are presented in Appendix B.

Gamma shine is apparent in the gamma scanning data. There are several, large areas with minimum count rates of 100,000 cpm up to count rates that exceed 999,999 cpm. Detector readings above any point within a high gamma shine areas are rendered artificially high by gamma radiation emanating from nearby areas. Gamma readings are expected to gradually approach those on the edges of the survey as soil is removed from the site.

To account for the shine, three gamma-soil concentration correlations were used. The first correlation was assigned to the entire data set. The data set was then divided into two sets. The first set consists of gamma data collected in areas where gamma shine is expected, and the second set consists of gamma data collected in areas along the edges of the survey, where gamma shine is limited.

Figure 2.2-1 shows two distinct areas, where gamma shine is or is not expected to be significant. The 50,000 cpm threshold between the areas was selected arbitrarily, although an analysis of the data indicates that the threshold is instructive.

Gamma counts and corresponding radium-226 concentrations for all correlation locations are listed in Table 2.2-1. The table indicates which data set to which a result was apportioned.

The plot of the entire data set is shown in Figure 2.2-2, where the least-squares-fit line applies to 40 of 40 data points. There were no outliers apparent in the data set.

The plot of data collected in the low gamma shine area is shown in Figure 2.2-3, where the least-squares fit line applies to 21 of 23 points. Two outliers were not considered in the regression.

The plot of data collected in the high gamma shine area is shown in Figure 2.2-4, where the least-squares fit line applies to 17 of 17 points.

The three equations relating radium-226 concentrations to gamma count rates in each data set is listed in Table 2.2-2. In the overall data set, 5 pCi/g radium-226 equates to an estimated 26,762 cpm. In the low shine areas, 5 pCi/g radium-226 equates to an estimated 21,402 cpm. In the high shine areas, 5 pCi/g radium-226 equates to an estimated 41,029 cpm.

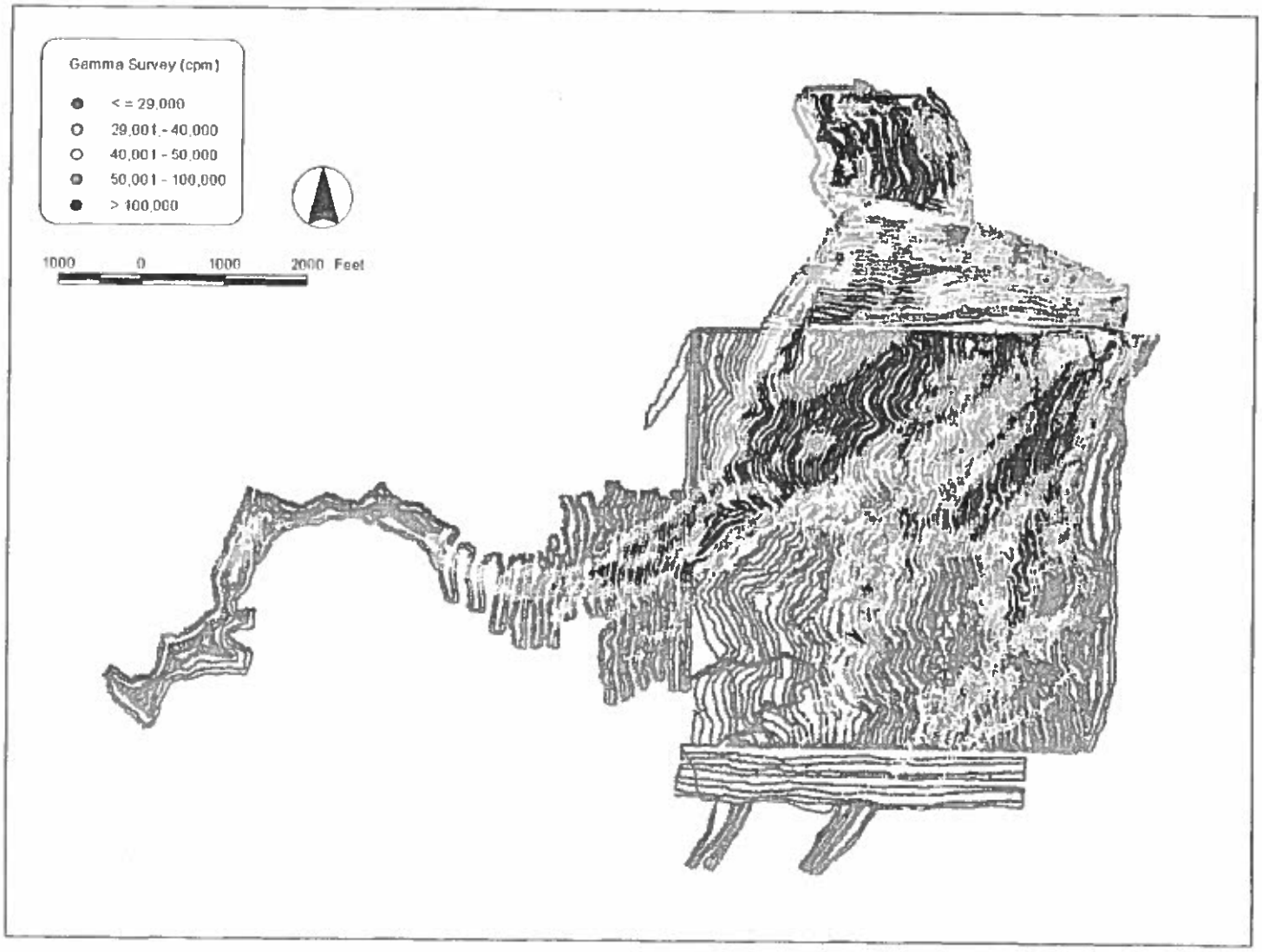


Figure 2.1-1. Section 35 and 36 Mine drainage gamma radiation scanning data

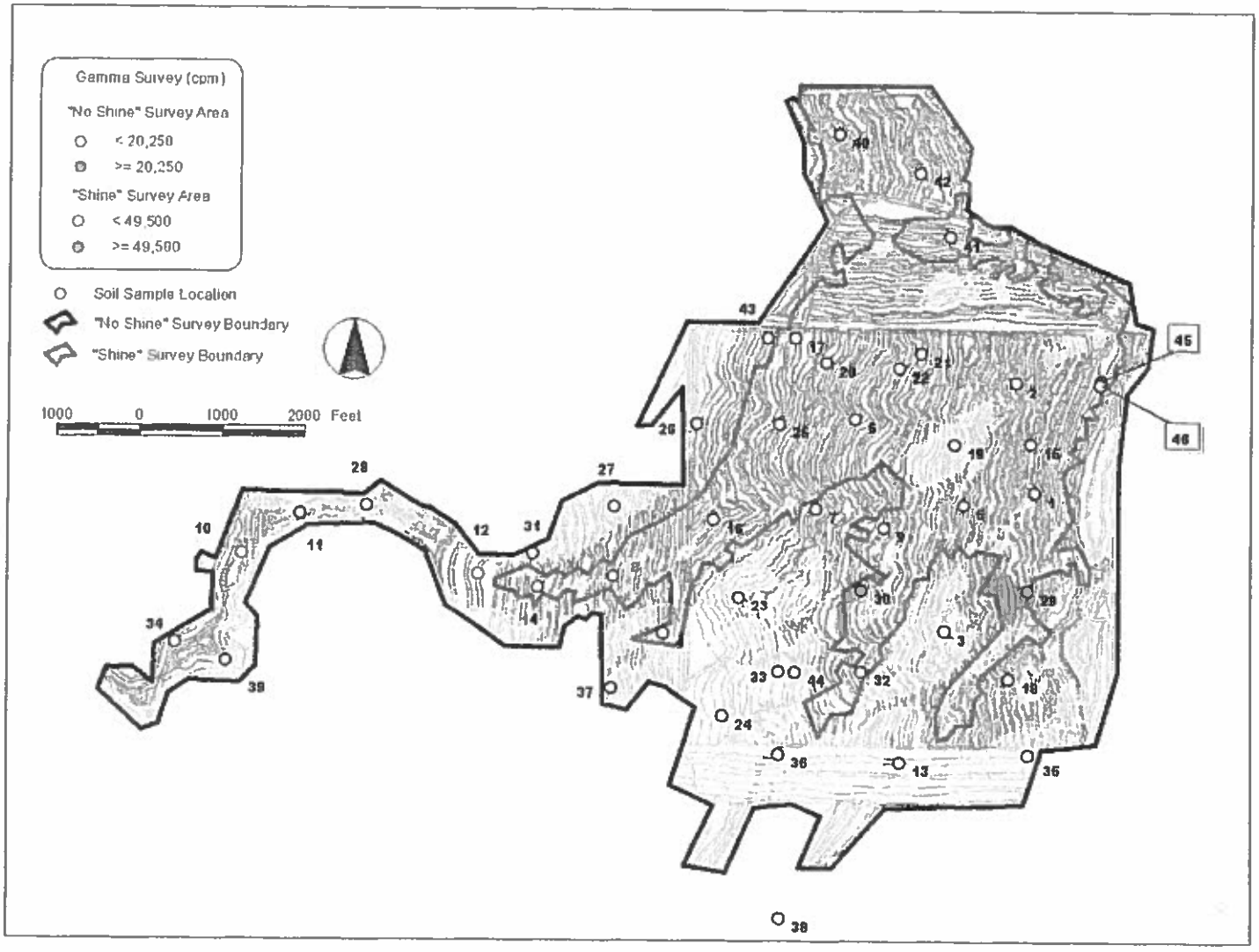


Figure 2.2-1. Distinct gamma scanning data sets

Table 2.2-1. Gamma count-soil concentration data

Sample Location No	Field Sample ID	Off-site Laboratory Sample ID	Offsite Radium-226 ± 2σ error (pCi/g)	Static Gamma Count (cpm)	Shine Area Data Set
1	062705-G	ERG062705-G	28.9±2.84	60254	High
2	062705-A	ERG062705-A	23.7±2.15	75277	High
3	062705-Q	ERG062705-Q	0.9±0.217	16519	Low
4	063005-S	ERG063005-S	19.4±1.80	48513	Low
5	062705-I	ERG062705-I*	80.8±7.09	155518	High
7	062805-LL	ERG062805-LL*	30.0±2.71	49980	High
8	063005-V	ERG063005-V	130±11.2	206865	High
9	062805-PP	ERG062805-PP	24.6±0.847	59215	High
10	063005-B	ERG063005-B	19.7±1.94	40136	Low
11	063005-F	ERG063005-F	1.92±0.326	19013	Low
12	063005-J	ERG063005-J	86.3±1.88	45000	Low
13	070105-A	ERG070105-A*	14.2±1.34	36394	Low
14	063005-O	ERG063005-O	69.0±6.25	62766	High
18	062705-V	ERG062705-V	15.6±1.44	35265	Low
19	062705-E	ERG062705-E	7.75±0.898	36255	High
20	062805-W	ERG062805-W	2.29±0.348	51831	High
21	062805-A	ERG062805-A	789±73.0	999999	High
23	062905-H	ERG062905-H	4.55±0.565	13689	Low
24	062905-G	ERG062905-G	0.594±0.176	11122	Low
25	062805-R	ERG062805-R	413±3.24	564020	High
26	062805-FF	ERG062805-FF	1.36±0.212	18858	Low
27	063005-AA	ERG063005-AA	1.49±0.193	16104	Low
28	063005-H	ERG063005-H*	1.19±0.296	14695	Low
29	062705-M	ERG062705-M	5.69±0.704	37192	High
30	062905-A	ERG062905-A	98.0±9.11	111263	High
31	063005-N	ERG063005-N	1.89±0.322	16520	Low
32	062705-CC	ERG062705-CC	37.3±1.11	56483	High
33	062905-F	ERG062905-F	0.872±0.194	12712	Low
34	062905-U	ERG062905-U	7.98±0.964	26087	Low
35	062705-AA	ERG062705-AA	1.10±0.331	16150	Low
36	070105-B	ERG070105-B	4.15±0.548	21940	Low
37	063005-R	ERG063005-R	8.50±0.566	21357	Low
38	070105-C	ERG070105-C	7.00±0.847	26038	Low
39	063005-A	ERG063005-A	1.375±0.245	17803	Low
40	062905-I	ERG062905-I	217±18.5	327196	High
41	062905-T	ERG062905-T*	0.932±0.217	22493	Low
42	062905-R	ERG062905-R	303±2.51	570630	High
43	062805-EE	ERG062805-EE	1.46±0.280	39380	Low
44	062905-E	ERG062905-E	0.705±0.230	13480	Low
45	T1-1A	ERG-TI-1A	27.4±0.686	104364	High

Notes:
cpm = counts per minute
pCi/g = picocuries per gram

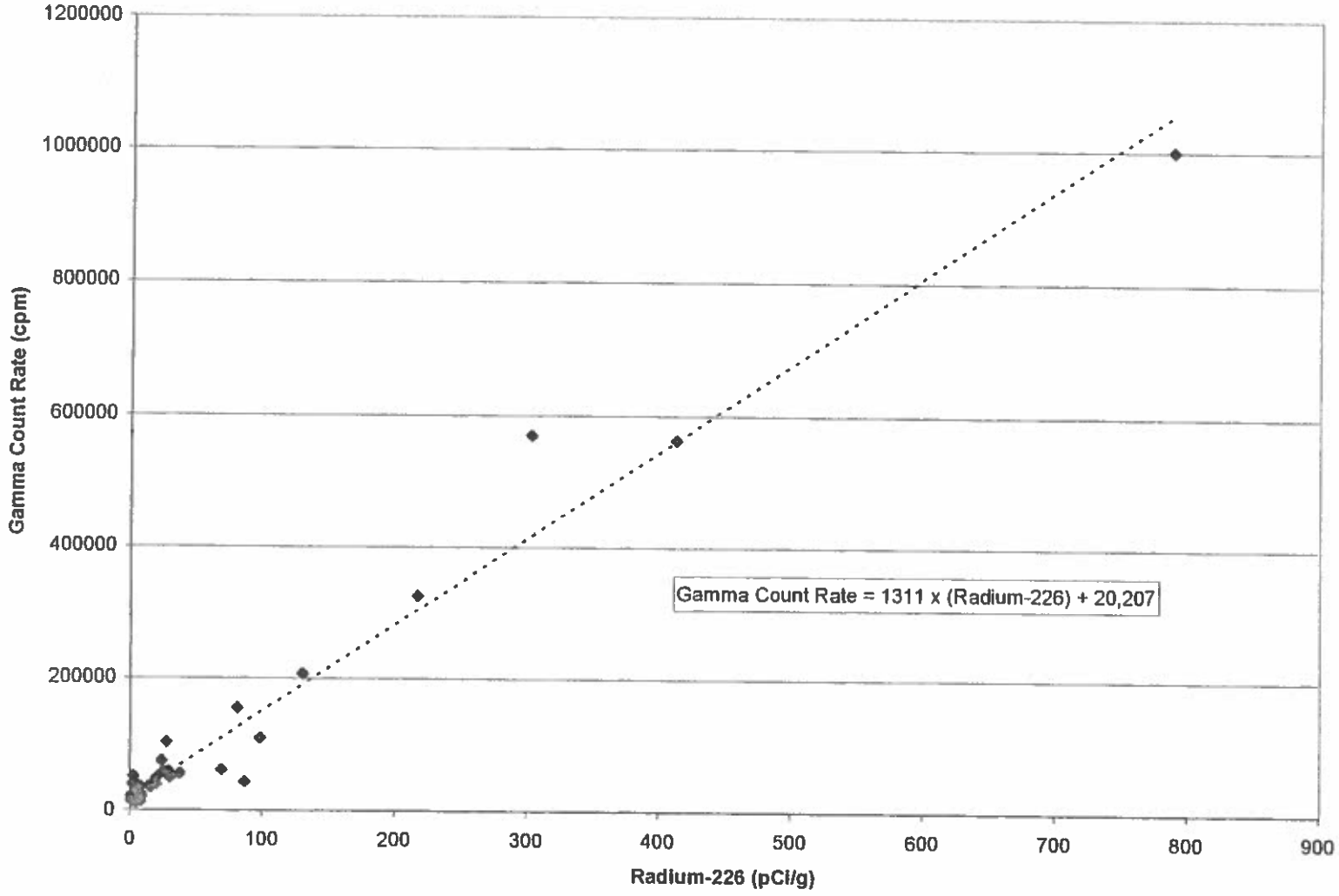


Figure 2.2-2. Plot of entire set of gamma count-soil concentration data

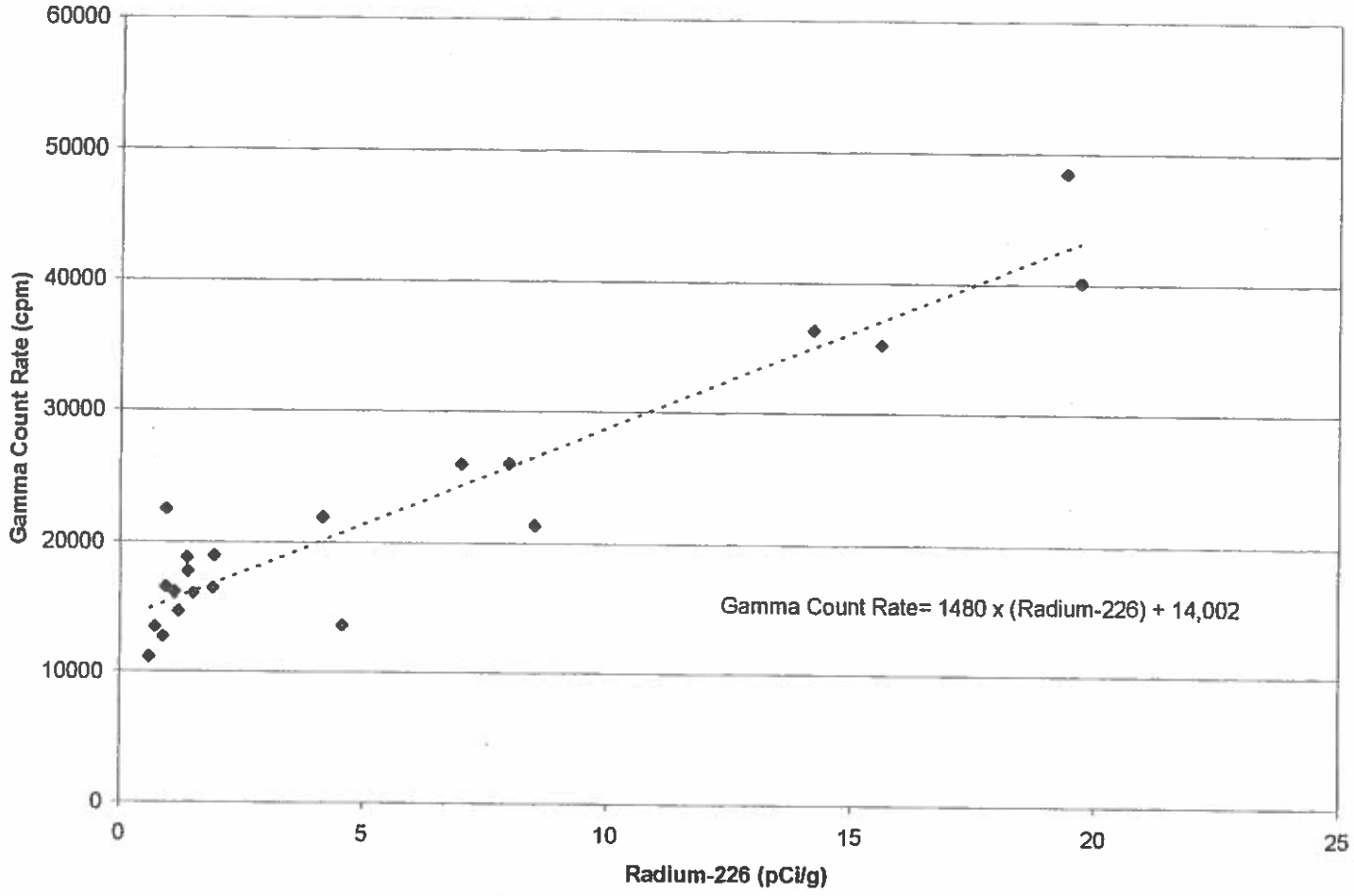


Figure 2.2-3. Plot of gamma count-soil concentration data in low shine areas

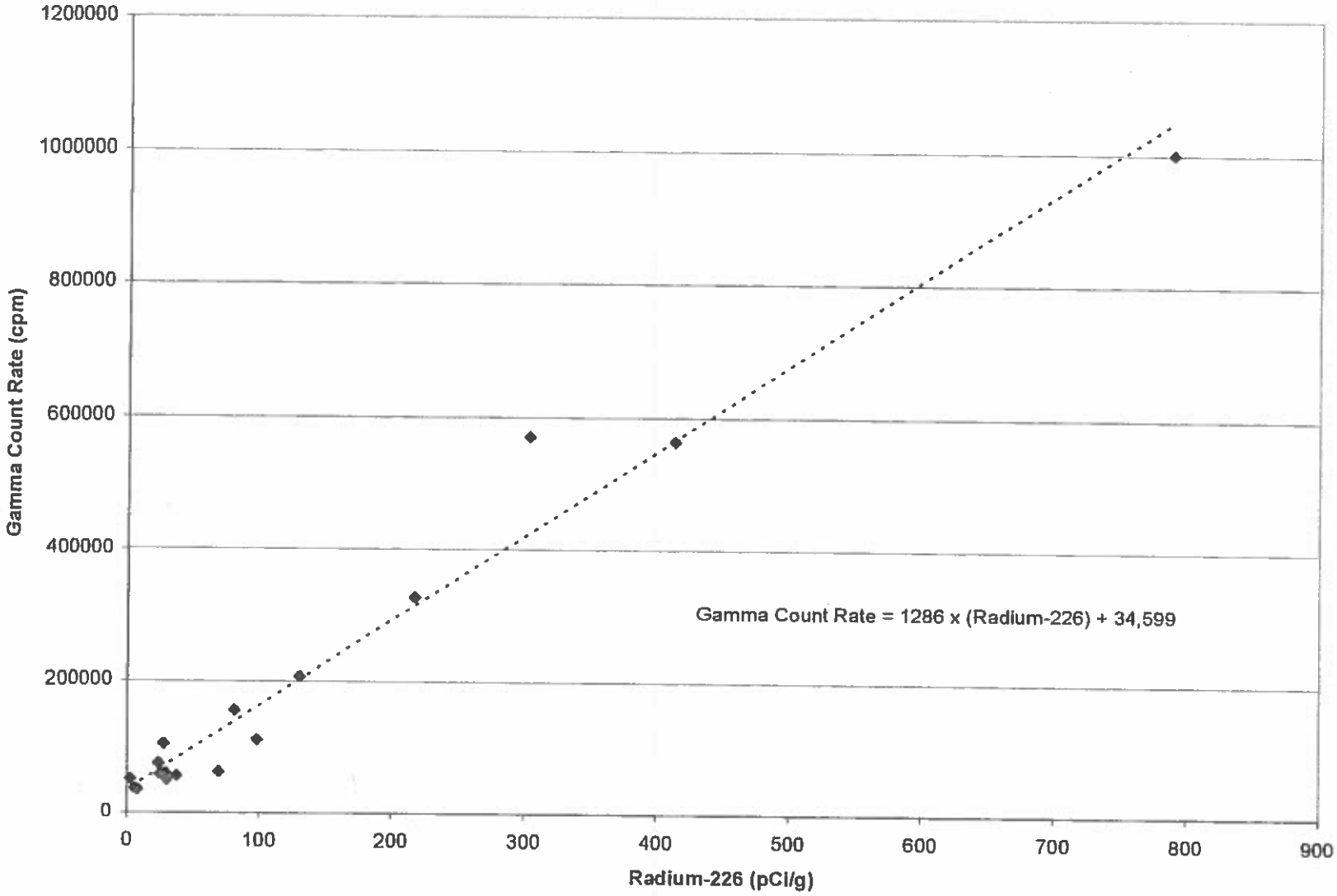


Figure 2.2-4. Plot of gamma count-soil concentration data in high shine areas

Table 2.2-2. Equations relating gamma counts to soil concentrations

Data Set	Linear Equation	Investigation Level (cpm)
All	$Gamma = 1311\ x\ C_{radium-226} + 20,207$	26,762
Low Gamma Shine	$Gamma = 1480\ x\ C_{radium-226} + 14,002$	21,402
High Gamma Shine	$Gamma = 1286\ x\ C_{radium-226} + 34,599$	41,029

Notes:
C = concentration
cpm = counts per minute

2.3 Limited Characterization of Vertical Extent

Field personnel installed shallow test pits at 44 locations in Sections 2, 3, and 4 (T 13N, R9W) and Section 35 (T 14N, R9W) to provide an estimate of the vertical extent of uranium and radium concentrations in surface and near-surface soils at the site. The locations are shown on Figure 2.2-1. Location numbers 19 and 43 in the figure are not test pits. These locations were used to collect samples for the gamma count-soil correlation. Test Pit Nos. 23 and 30 were installed in blowsands. Test Pit No. 46 was installed in the base of the largest arroyo observed at the site: at the north end of Section 2.

The test pits were installed using a backhoe. Field personnel screened one of the sidewalls of each test pit, using a Ludlum Model 44-40 shielded Geiger-Mueller pancake probe coupled to a Ludlum Model 2221 ratemeter/scaler. Field personnel took 1-minute integrated counts from each 6-in section of the wall extending from the surface to at most 48 in. below ground surface (bgs). Samples were collected from one or more of these depth intervals, based on the observed readings and soil conditions (moisture content and type). The samples were collected by scoring the sidewalls with a narrow-blade shovel. Samples were collected in Ziploc bags, held at the base of each sampling interval and directly beneath the shovel when the sidewalls were scored, to minimize sampling across intervals. The samples were analyzed by GEL for radium-226 and uranium-238 via gamma spectroscopy analysis (EML HASL 300, 4.5.2.3). The laboratory analytical data are presented in Appendix B.

General observations from this portion of the investigation are:

- G-M readings correlate favorably to radium-226 concentrations in associated soils.
- Radium-226 concentrations decrease with increasing depth.
- With several exceptions, radum-226 concentrations generally exceed the selected cut off limit in surface soil but not subsurface soil.
- The range of radium-226 concentrations in the samples is 0.529 to 789 pCi/g. The range of uranium concentrations in the samples is -0.796 to 55.8 pCi/g.
- There appears to be a poor correlation between uranium-238 and radium-226 concentrations.
- The large blow-sand areas in the south of Section 2 do not appear to be covering contaminated soil.

Table 2.3-1. Observations in test pits

						Radionuclide Concentrations[a]	
Test Pit No.[b]	Date Installed	Field Sample ID	Off-site Laboratory Sample ID[c]	Depth (in.)	Shielded G-M reading (cpm)	Radium-226 ±2σ error (pCi/g)	Uranium-238 ±2σ error (pCi/g)
1	7/11/2005	062705-F	ERG062705-F	0-6	167	11.1±0.642	4.49±6.14
	6/27/2005	062705-G	ERG062705-G	6-12	189	28.9±2.84	4.27±2.36
			NS	18-24	234		
		062705-H	ERG062705-H	24-30	167	9.13±0.483	8.11±4.03
			NS	36-42	87		
2	6/27/2005	062705-A	ERG062705-A	0-6	135	23.7±2.15	5.43±6.05
		062705-B	ERG062705-B	12-18	99	1.41±0.350	2.77±2.10
3	6/27/2005	062705-Q	ERG062705-Q	0-6	67	0.926±0.217	0.759±1.93
		062705-R	ERG062705-R	6-12	63	0.766±0.232	1.54±2.19
		062705-S	ERG062705-S	12-18	64	0.733±0.209	0.971±1.40
		062705-T	ERG062705-T	18-24	79	0.680±0.211	1.56±2.19
4	6/30/2005	063005-S	ERG063005-S	0-6	127	19.4±1.80	8.12±6.78
		063005-T	ERG063005-T	6-12	109	8.71±0.936	26.1±5.54
		063005-U	ERG063005-U	12-18	82	1.02±0.252	5.78±3.84
		NS	NS	18-24	68		
5	6/27/2005	062705-I	ERG062705-I*	0-6	389	80.8±7.09	13.7±17.2
		062705-J	ERG062705-J	6-12	NT	13.8±1.35	15.6±8.06
		062705-K	ERG062705-K	12-18	179	1.23±0.249	5.55±3.47
		062705-L	ERG062705-L	18-24	102	0.987±0.257	8.52±2.40
		NS	NS	30-36	98		
		NS	NS	42-48	93		
6	6/28/2005	062805-L	ERG062805-L	0-6	1046	45.7±1.27	18.4±7.94
		062805-M	ERG062805-M	6-12	348	4.88±0.670	14.3±3.77
		062805-N	ERG062805-N	12-18	216	2.42±0.398	7.74±2.68
		062805-O	ERG062805-O	18-24	369	2.55±0.497	8.23±2.93
		062805-P	ERG062805-P	24-30	338	1.25±0.251	11.9±5.24
		062805-Q	ERG062805-Q	30-36	NT	127±11.9	13.1±6.97
7	6/28/2005	062805-LL	ERG062805-LL*	0-6	129	30.0±2.71	10.7±9.05
		062805-MM	ERG062805-MM	6-12	113	2.77±0.416	9.29±7.41
		062805-NN	ERG062805-NN*	12-18	85	0.927±0.262	7.20±3.57
		062805-OO	ERG062805-OO	18-24	61	1.38±0.256	2.50±1.01
8	6/30/2005	063005-V	ERG063005-V	0-6	642	130±11.2	2.90±16.2
		063005-X	ERG063005-X	6-12	162	12.1±1.23	21.8±8.15
		063005-Y	ERG063005-Y	12-18	116	2.80±0.424	15.2±7.49
		063005-Z	ERG063005-Z	18-24	99	1.39±0.261	3.70±4.05
		NS	NS	30-36	75		

Table 2.3-1. Observations in test pits (continued)

Test Pit No.[b]	Date Installed	Field Sample ID	Off-site Laboratory Sample ID[c]	Depth (in.)	Shielded G-M reading (cpm)	Radionuclide Concentrations[a]	
						Radium-226 (pCi/g)	Uranium-238 (pCi/g)
9	6/28/2005	062805-PP	ERG062805-PP	0-6	191	24.6±0.847	19.2±9.83
		062805-QQ	ERG062805-QQ	6-12	89	1.63±0.333	5.75±1.68
		062805-RR	ERG062805-RR	12-18	75	4.37±0.543	3.66±2.79
		062805-SS	ERG062805-SS	18-24	83	1.97±0.329	7.92±3.82
10	6/30/2005	063005-B	ERG063005-B	0-6	174	19.7±1.94	27.5±6.46
		063005-C	ERG063005-C*	6-12	152	3.88±0.621	20.1±6.00
		063005-D	ERG063005-D	12-18	98	2.68±0.449	6.75±7.76
		063005-E	ERG063005-E*	18-24	89	1.67±0.294	8.14±4.63
11	6/30/2005	063005-F	ERG063005-F	0-6	93	1.92±0.326	6.27±3.71
		NS	NS	6-12	88		
		063005-G	ERG063005-G	12-18	120	1.08±0.233	14.7±4.68
		NS	NS	18-24	88		
12	6/30/2005	063005-J	ERG063005-J	0-6	165	86.3±1.88	22.6±13.3
		063005-K	ERG063005-K	6-12	142	23.1±2.08	5.24±6.30
		063005-L	ERG063005-L	12-18	105	1.81±0.403	8.10±4.15
		063005-M	ERG063005-M*	18-24	90	1.25±0.313	7.56±4.23
13	7/1/2005	070105-A	ERG070105-A*	0-6	135	14.2±1.34	2.84±4.44
		NS	NS	6-12	91		
14	6/30/2005	063005-O	ERG063005-O	0-6	217	69.0±6.25	11.1±5.02
		063005-P	ERG063005-P	6-12	110	2.36±0.381	9.63±3.91
		063005-Q		12-18	70	1.12±0.273	6.58±3.20
		NS	NS	18-24	72		
15	6/27/2005	NS	NS	0-6	1412		
		062705-C	ERG062705-C	18-24	111	2.06±0.331	8.24±6.73
		062705-D	ERG062705-D	36-42	104	1.10±0.272	5.30±3.39
16	6/28/2005	062805-HH	ERG062805-HH	0-6	632	1.49±0.282	8.25±4.79
		062805-II	ERG062805-II	6-12	356	1.84±0.247	8.42±2.70
		062805-JJ	ERG062805-JJ*	12-18	154	2.85±0.245	4.69±3.58
		062805-KK	ERG062805-KK	18-24	118	1.88±0.404	10.0±3.66
17	6/28/2005	062805-AA	ERG062805-AA*	0-6	394	271±2.43	27.4±17.6
		062805-BB	ERG062805-BB	6-12	233	31.7±2.92	8.90±10.3
		062805-CC	ERG062805-CC	12-18	130	0.988±0.184	5.33±2.91
		062805-DD	ERG062805-DD	18-24	101	0.656±0.180	0.00±2.95
18	6/27/2005	062705-U	ERG062705-U	0-6	89	15.5±1.47	9.84±5.85
		062705-V	ERG062705-V	6-12	178	15.6±1.44	6.11±7.89
		062705-W	ERG062705-W	12-18	107	1.04±0.245	6.81±3.28
		062705-X	ERG062705-X	18-24	95	1.48±0.307	4.98±2.13

Table 2.3-1. Observations in test pits (continued)

Test Pit No.[b]	Date Installed	Field Sample ID	Off-site Laboratory Sample ID[c]	Depth (in.)	Shielded G-M reading (cpm)	Radionuclide Concentrations[a]	
						Radium-226 (pCi/g)	Uranium-238 (pCi/g)
20	6/28/2005	062805-W	ERG062805-W	0-6	98	2.29±0.348	2.36±2.83
		062805-X	ERG062805-X	6-12	80	1.97±0.354	2.02±2.62
		062805-Y	ERG062805-Y	12-18	83	0.868±0.370	0.00±1.96
		062805-Z	ERG062805-Z	18-24	64	2.20±0.392	0.505±0.968
21	6/28/2005	062805-A	ERG062805-A	0-6	3402	789±73.0	38.6±16.6
		062805-B	ERG062805-B	6-12	3564	254±26.8	30.8±16.5
		062805-C	ERG062805-C	12-18	1282	6.38±0.416	12.9±5.16
		062805-D	ERG062805-D	18-24	1630	5.87±0.704	12.8±7.42
		062805-E	ERG062805-E	30-36	232	2.08±0.381	7.95±5.28
		062805-F	ERG062805-F	36-42	146	11.9±0.542	12.9±6.26
22	6/28/2005	062805-G	ERG062805-G	0-6	3406	604±4.22	20.8±26.5
		062805-H	ERG062805-H	6-12	509	60.0±5.48	24.5±6.75
		062805-I	ERG062805-I	12-18	9863	12.4±1.39	24.8±5.67
		062805-J	ERG062805-J	18-24	632	1.78±0.334	15.2±3.39
		062805-K	ERG062805-K	24-30	226	0.628±0.136	7.74±2.61
		NS	NS	30-36	150		
23	6/29/2005	062905-H	ERG062905-H	0-6	82	4.55±0.565	3.93±3.92
		NS	NS	6-12	58		
		NS	NS	12-18	67		
		NS	NS	18-24	80		
		NS	NS	24-30	77		
		NS	NS	30-36	69		
		NS	NS	36-42	64		
24	6/29/2005	062905-G	ERG062905-G	0-6	83	0.594±0.176	-0.796±2.83
		NS	NS	6-12	80		
		NS	NS	12-18	71		
		NS	NS	18-24	49		
		NS	NS	24-30	58		
		NS	NS	30-36	68		
		NS	NS	36-42	57		
25	6/28/2005	062805-R	ERG062805-R	0-6	1240	413±3.24	20.8±24.3
		062805-S	ERG062805-S	6-12	246	5.68±0.699	12.0±6.91
		062805-T	ERG062805-T	12-18	136	1.245±0.216	10.35±3.57
		062805-U		18-24	282		
		062805-V	ERG062805-V	24-30	94	15.1±1.42	5.86±5.08
26	6/28/2005	062805-FF	ERG062805-FF	0-6	67	1.36±0.212	1.34±1.68
		062805-GG	ERG062805-GG	6-12	79	1.44±0.263	2.585±2.59
		NS	NS	12-18	54		

Table 2.3-1. Observations in test pits (continued)

Test Pit No.[b]	Date Installed	Field Sample ID	Off-site Laboratory Sample ID[c]	Depth (in.)	Shielded G-M reading (cpm)	Radionuclide Concentrations[a]	
						Radium-226 (pCi/g)	Uranium-238 (pCi/g)
27	6/30/2005	063005-AA	ERG063005-AA	0-6	61	1.49±0.193	0.470±2.01
		NS	NS	6-12	62		
		NS	NS	12-18	68		
		NS	NS	18-24	72		
28	6/30/2005	063005-H	ERG063005-H*	0-6	99	1.19±0.296	8.80±4.72
		063005-I	ERG063005-I	6-12	94	1.49±0.315	15.7±3.64
		NS	NS	12-18	88		
		NS	NS	18-24	82		
29	6/27/2005	062705-M	ERG062705-M	0-6	86	5.69±0.704	2.95±3.90
		062705-P	ERG062705-P	6-12	65	0.837±0.259	2.15±1.47
		062705-O	ERG062705-O	12-18	79	0.619±0.213	2.70±2.62
		062705-N	ERG062705-N	18-24	57	0.595±0.214	1.11±2.31
		NS	NS	30-36	76		
		NS	NS	42-48	69		
30	6/29/2005	062905-A	ERG062905-A	0-6	296	98.0±9.11	4.16±17.5
		062905-B	ERG062905-B	6-12	274	29.0±1.14	7.81±6.95
		062905-C	ERG062905-C	12-18	123	58.25±4.64	22±14.8
		062905-D	ERG062905-D	18-24	88	3.60±0.534	9.28±4.46
31	6/30/2005	063005-N	ERG063005-N	0-6	65	1.89±0.322	0.435±2.61
		NS	NS	6-12	75		
		NS	NS	12-18	76		
		NS	NS	18-24	61		
32	6/27/2005	062705-CC	ERG062705-CC	0-6	175	37.3±1.11	13.2±8.24
		062705-DD	ERG062705-DD	6-12	78	0.809±0.220	3.95±2.90
		062705-EE	ERG062705-EE	12-18	81	0.529±0.173	2.30±0.856
		062705-FF	ERG062705-FF	18-24	64	1.07±0.216	2.77±2.97
33	6/29/2005	062905-F	ERG062905-F	0-6	66	0.872±0.194	0.832±0.959
		NS	NS	6-12	51		
		NS	NS	12-18	66		
		NS	NS	18-24	76		
		NS	NS	24-30	69		
		NS	NS	30-36	62		
34	6/29/2005	062905-U	ERG062905-U	0-6	177	7.98±0.964	26.2±8.45
		062905-V	ERG062905-V	6-12	126	3.80±0.585	18.5±4.29
		062905-W	ERG062905-W	12-18	96	10.1±1.11	6.22±2.41
		062905-X	ERG062905-X	18-24	76	3.40±0.406	6.00±7.21
35	6/27/2005	062705-AA	ERG062705-AA	12-18	75	1.10±0.331	2.24±3.00
		062705-BB	ERG062705-BB	18-24	85	1.29±0.287	1.76±1.18
		062705-Y	ERG062705-Y	0-6	73	1.02±0.215	0.907±0.932
		062705-Z	ERG062705-Z	6-12	70	0.792±0.198	2.90±3.96

Table 2.3-1. Observations in test pits (continued)

Test Pit No.[b]	Date Installed	Field Sample ID	Off-site Laboratory Sample ID[c]	Depth (in.)	Shielded G-M reading (cpm)	Radionuclide Concentrations[a]	
						Radium-226 (pCi/g)	Uranium-238 (pCi/g)
36	7/1/2005	070105-B	ERG070105-B	0-6	100	4.15±0.548	3.89±2.16
		NS	NS	6-12	89		
37	6/30/2005	063005-R	ERG063005-R	0-6	109	8.50±0.566	12.3±5.81
		NS	NS	6-12	67		
		NS	NS	12-18	68		
		NS	NS	18-24	61		
38	7/1/2005	070105-C	ERG070105-C	0-6	138	7.00±0.847	9.68±2.96
		070105-D	ERG070105-D	6-12	121	2.16±0.370	13.1±5.92
39	6/30/2005	063005-A	ERG063005-A	0-6	87	1.375±0.245	2.195±2.13
		NS	NS	6-12	58		
		NS	NS	12-18	71		
		NS	NS	18-24	72		
40	6/29/2005	062905-I	ERG062905-I	0-6	839	217±18.5	14.4±14.7
		062905-J	ERG062905-J	6-12	246	2.20±0.343	39.4±10.9
		062905-K	ERG062905-K	12-24	149	3.00±0.452	21.8±4.56
		062905-L	ERG062905-L	24-30	89	2.57±0.320	10.8±4.00
		NS	NS	30-36	80		
		NS	NS	36-42	58		
		NS	NS	42-48	56		
41	6/29/2005	062905-T	ERG062905-T*	0-6	52	0.932±0.217	1.75±1.67
		NS	NS	6-12	60		
		NS	NS	12-18	56		
		NS	NS	18-24	56		
		NS	NS	24-30	60		
		NS	NS	30-36	62		
42	6/29/2005	062905-M	ERG062905-M	0-6	1190	281±23.4	11.3±16.7
		062905-N	ERG062905-N	6-12	1796	260±2.88	29.6±23.9
		062905-O	ERG062905-O*	12-18	1143	171±14.4	9.54±13.6
		062905-P	ERG062905-P	18-24	1269	96.3±8.12	6.01±13.6
		062905-Q	ERG062905-Q	24-30	1362	120.5±10.7	11.45±5.90
		062905-R	ERG062905-R	30-36	2066	303±2.51	14.7±17.2
		062905-S	ERG062905-S	36-42	1080	89.1±7.73	10.4±12.3
44	6/29/2005	062905-E	ERG062905-E	0-6	66	0.705±0.230	0.831±1.08
		NS	NS	6-12	49		
		NS	NS	12-18	80		
		NS	NS	18-24	65		
		NS	NS	24-30	63		
		NS	NS	30-36	51		
		NS	NS	36-42	70		
		NS	NS	42-48	63		

Table 2.3-1. Observations in test pits (concluded)

						Radionuclide Concentrations[a]	
Test Pit No.[b]	Date Installed	Field Sample ID	Off-site Laboratory Sample ID[c]	Depth (in.)	Shielded G-M reading (cpm)	Radium-226 (pCi/g)	Uranium-238 (pCi/g)
45	7/14/2005	TI-1A	ERG-TI-1A	0-6	250	27.4±0.686	11.1±6.63
		TI-1B	ERG-TI-1B	6-12	335	59.9±5.42	21.9±6.82
		TI-1C	ERG-TI-1C	12-18	391	43.1±4.36	14.1±8.79
		TI-1D	ERG-TI-1D	18-24	175	13.6±1.34	14.8±8.64
		TI-1E	ERG-TI-1E	24-30	130	5.98±0.570	6.77±3.79
		TI-1F	ERG-TI-1F	30-36	110	2.18±0.383	6.39±5.14
46	7/14/2005	TI-2A	ERG-TI-2A	0-6	433	191±16.3	38.1±18.4
		TI-2B	ERG-TI-2B	6-12	792	383±32.9	55.8±32.6
		TI-2C	ERG-TI-2C	12-18	1166	630±5.19	130±40.0
		TI-2D	ERG-TI-2D*	18-24	171	16.4±1.72	35.1±7.05
		TI-2E	ERG-TI-2E	24-30	165	3.90±0.522	14.1±3.27
		TI-2F	ERG-TI-2F	30-36	121	13.1±0.545	22.5±6.55
		TI-2G	ERG-TI-2G	36-42	94	9.34±0.556	13.5±5.55
		TI-2H	ERG-TI-2H	42-48	71	3.025±0.442	8.9±6.21

Notes:
[a]Results determined by GEL Laboratories
[b]Location nos. 19 and 43 not listed. No test pits installed at these locations.
[c]Results for samples with asterisks are the averages of the sample and its replicate.
in. = inches
NS = Not sampled

Radium-226 concentrations are below their respective cutoff criteria in 17 of 44 test pits. Radium-226 concentrations exceed the surface and/or subsurface criteria in 27 of 44 test pits. Radium-226 concentrations exceed the subsurface criterion in 12 of 44 test pits.

Two exceptions to the general observations are:

- Radium-226 concentrations in Test Pit No. 6 exceed the surface criterion but do not exceed the subsurface criterion until the 36 to 42 in. depth.
- Radium-226 concentrations in Test Pit No. 42 exceed both the surface criterion and the subsurface criterion to 48 in. bgs.